The IRON AGE

Vol. 159, No. 3 January 16, 1947

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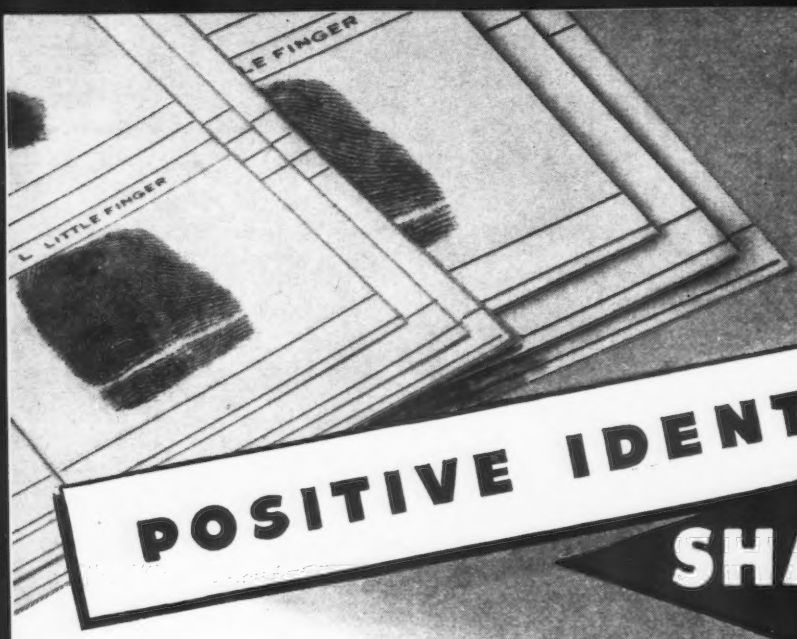

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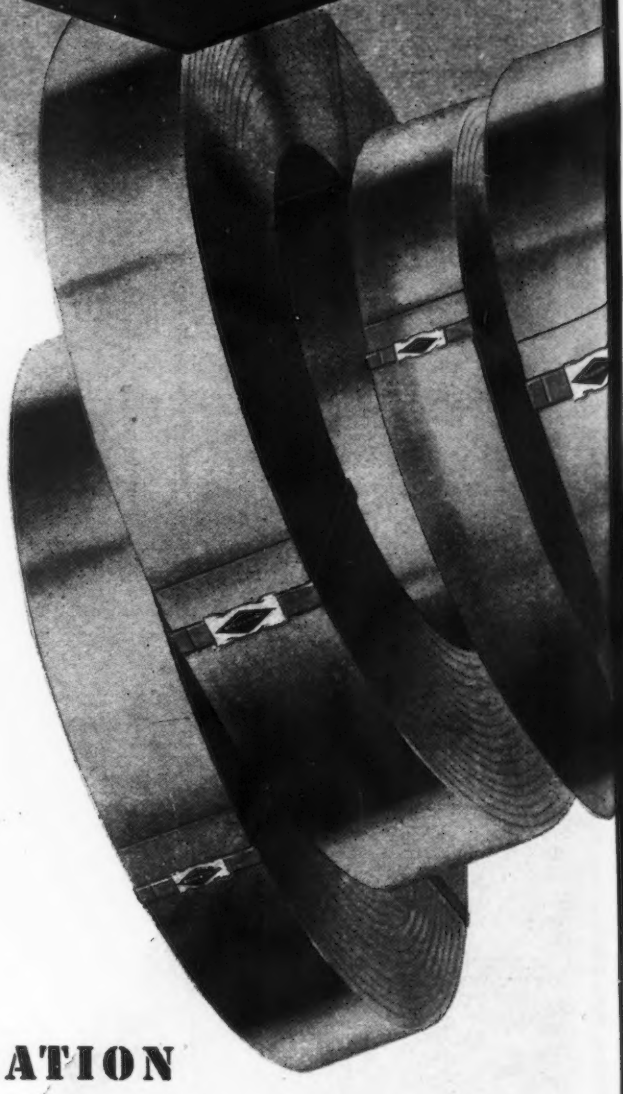

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January 16, 1947

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"Arise, Ye Pris'ners . . . !"

OVER in the citadel of the proletariat, they seem to be having their quota of reconversion ills—labor turmoil, inflation, bureaucratic fumbling and sags in productivity. Every time a Stalinist brass-hat makes a speech he opens the door on more economic and political skeletons which seem to be rattling around with considerable vigor.

Not only do the proletarians seem to be able to match anything troubling the American scene, but, what's more, goodly portions of the post-revolution zealots seem to have committed the cardinal sin—they went capitalistic during the war when the secret police were busied elsewhere. Many prominent artists, scientists, and practically the entire managerial class, are now indulging in quite a storm of self-flagellation, trying to grab hold of the ideological band-wagon before someone starts swinging a tommy-gun.

There's a disquieting air of unreality to all the wrist-slapping and tut-tutting going on. It's not a bit in character, for saboteurs of the State heretofore have had a rather abrupt time of it. Best explanation seems to be that so many are involved that they hardly know where to start. And, anyhow, Stalin seems to have gone slightly mellow and has lost a little of his zest for blood. It may be that the Party feels sufficiently entrenched that the excesses caused by fear are not necessary, and routine banishment, the concentration camp and a little psychological terror will do the job. If not, it shouldn't be long before the second team—Molotov, Bulganin, Beriya and Zhdanov—will have the opportunity to get in there pitching with the standard liquidating technique which has been so educational in the past.

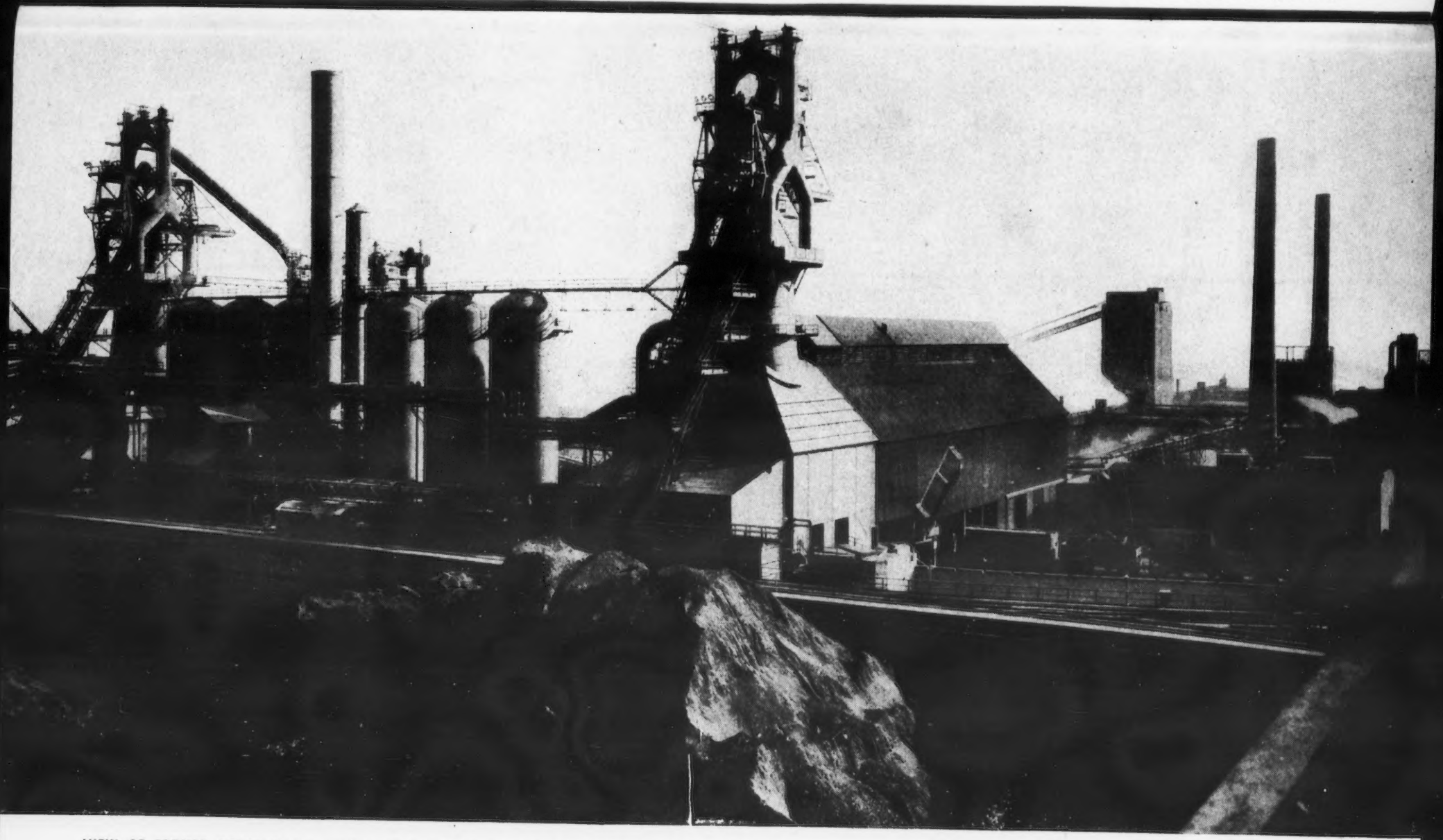
To celebrate the anniversary of the Bolshevik revolution, Zhdanov confirmed what a number of lesser functionaries have been saying in print for the past six months.

Practically all of heavy industry is poking along at a rather dismal rate. Most of the workers are soldiering on the job, and the managers (so-called guardians of the faith) continue to falsify production records and pocket money for private luxuries. In many instances all concerned—the party watchdogs, the plant managers and the workers—have teamed up in a "Mutual Society for the Exploitation of Industrial Enterprises for Private Profit."

The same situation holds in the collective farm system—one big prop of the entire Soviet economy—and Zhdanov admits an "ideological break-through" of such scope that the setup faces "bankruptcy." The Co-operatives, another bulwark of the Soviet economy, are being flayed for abysmal failure, and have been ordered to tidy up around the edges.

With Pravda repeatedly crying out that "the situation is extremely dangerous for the whole structure of the country," it is to be assumed that some dramatic correctives may be in prospect—and they won't be Congressional elections!

T. W. Lippert



VIEW OF FORMER GOVERNMENT OWNED BLAST FURNACE PLANT BOUGHT BY INLAND

This plant was originally built and operated by Inland for the government to produce additional iron for war purposes. It covers 50 acres adjoining Inland's Indiana Harbor Works, and includes two 1,000 ton blast furnaces, two batteries of coke ovens, and a by-product plant.

The purchasing agreement provides that Inland shall produce merchant pig iron for the veterans' housing program for a period of time. Later on, however, it will form the basis for an increase in Inland's overall steel capacity.

INLAND STEEL COMPANY, CHICAGO, ILLINOIS

► Despite some opinion to the contrary, there are less than a dozen guaranteed annual wage plans in effect in the metalworking industry. This information is based on a National Industrial Conference Board report which combines the board's data with that from three Government reports or surveys on the subject, thereby showing a percentage of less than 1/20 of 1 pct for the metalworking industry.

► Some price battle scarred steel men are privately wagging their heads at the present steel price level and bemoaning the fact that when supply catches up with demand a happy hunting ground could materialize for anyone who got there first and filled up his mill with substantial tonnages at "slightly below the market." Even though the price advances have been forced by higher wages, material costs and freight rates, no one is happy about them.

► Rubber mountings applied to jolt-rollover molding machines in an eastern foundry have reduced beyond expectation the vibration in surrounding areas. At least half a dozen have been so equipped to date.

► The President's emphasis on monopolies and economic concentration in his State of the Union message, coupled with some congressional attacks on the country's larger business enterprises may not produce immediate action at present. But the advent of another depression would see a terrific barrage leveled at "big business" since all the ammunition is being stacked in the gun pits ready for firing.

► Pig iron output in the United States zone of Germany in September exceeded the 1938 average according to latest available official statistics. Ingot steel and steel rolling mill products were running at better than half the 1938 average. Electric light bulbs were within 10 pct of the prewar figure while dry batteries were more than double the 1938 rate.

► It has been predicted by one prominent producer that the extensive use of plastic tubing for house heating is only 2 years away. The reported adoption of a plastic fuel line specification by a major motor car manufacturer, while still unconfirmed, is a matter of considerable interest.

► Tie-in sales of scrap for steel and vice versa, one of the causes of the recent scrap price rises, are now on the decline. Long scrap hauls from "remote" areas still continue, causing many producers to pay higher than quoted delivered prices in the consuming district.

► By 1950 British airlines may be operating three 100-passenger Bristol Brabazon airliners in transatlantic service. Plans call for the 350-mph ships to be powered by eight 3500-hp Bristol gas turbine engines.

► A major automobile producer is reported to have received a telegram from a New York firm offering to supply 600,000 tons of new steel sheets during 1947 at approximately three times the current market price. Equally high offers have been rumored in major industrial centers but actual proof of delivery on quotations of this sort is unobtainable.

► Plans for development of lightweight cars, introduction of new models and automotive plant expansions are all being held in abeyance, it is reported, until definitely favorable developments are in sight on the automotive labor front.

► Tinning cast iron by means of the new fused salt baths is said to result in better adhesion than the older methods and to give smoother and more continuous coatings.

► Several new developments in the honing field make possible the removal of 25 to 30 times as much stock at rates 10 to 12 times faster than was formerly considered practicable. In addition, stone life has been increased as much as 1500 pct.

► Graphite ingot molds, in a two-part design, are reported to produce steel with a more homogeneous structure while reducing mold cost, labor cost and surface conditioning expense. It should be noted that this was a relatively small tool steel mold, rather than a commercial size ingot mold.

Inspecting Turbosupercharger Blades —

By E. C. POLIDOR
Chief Engineer
Engineers Specialties Div.,
Universal Engraving & Colorplate Co., Inc.
Buffalo

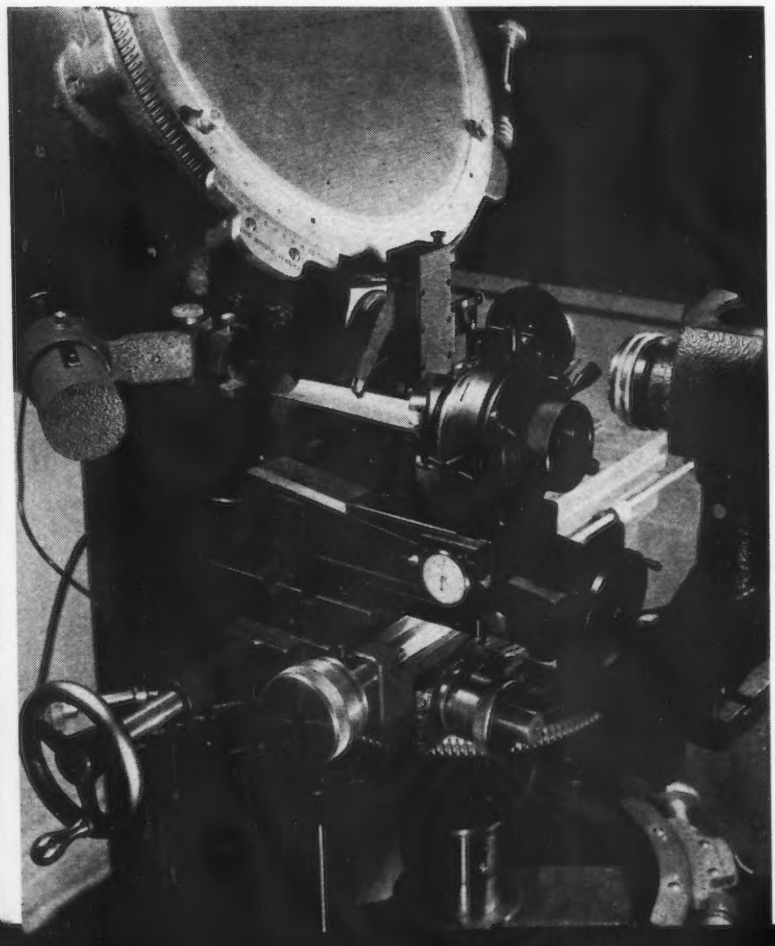
RECENT developments in jet propulsion have introduced many new problems which have in turn resulted in the production of new devices and techniques. A fast and accurate method of inspecting blade and bucket profiles has been a problem of major importance, for without full knowledge of this important section of the complete development, progress would be retarded. A solution to this problem has been found in the newly developed Pant-O-Jector, fig. 1, manufactured by Engineers Specialty Div., of Universal Engraving & Colorplate Co., Inc., Buffalo, N. Y.

The principle of the Pant-O-Jector is simple. Since it is not possible to gage the actual surface of the blades or vanes other than by use of templates, formed to exact specifications, or by measuring coordinate points from given datum lines, the resulting conclusion is a pantograph.

A pantograph works on the principle of a parallelogram which insures a duplicate motion from follower to scribing point. There are many forms of pantographs, but in this instrument the simplest form, the X and Y motion is used. It was also felt that there were many advantages to tracing the path of the scribing end of a pantograph on a projection instrument at a known magnification; hence, pantograph on a projector, or Pant-O-Jector.*

* *Patent pending.*

All the base units developed for checking blades or vanes follow the same principle, X and Y displacement resulting in as nearly perfect motion in the horizontal and vertical planes as is possible to build. It must be as nearly perfect as possible, for without this accuracy the desired results cannot be attained. These units are built so that as the base travels in the horizontal plane another moving part, the sleeve, can move in the vertical plane, guided by an upright post fastened to the base which moves in the horizontal plane. In other words, vertical and horizontal movement will always be exactly 90° apart, and these units are made to stay that way because both motions are assembled using preloaded ball bearings, and are so designed that

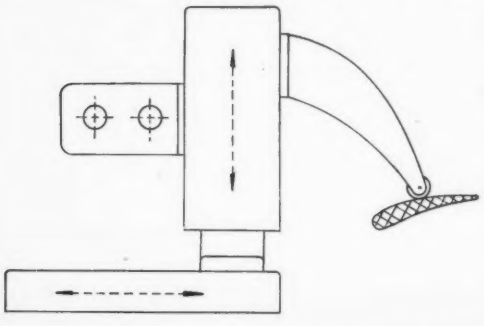


LEFT

FIG. 1—Pant-O-Jector setup on a standard J&L comparator showing the manner in which the tracer arm rests on the workpiece.

BELOW

FIG. 2—Schematic outline of the arrangement of a Pant-O-Jector for checking one side of a blade at a time.



By Optical Projection Comparator

Inspecting the contour of turbosupercharger blades has hitherto been a difficult and tedious operation, and has necessarily involved a good deal of human judgment. How this can now be done rapidly and accurately by the use of a newly developed instrument known as the Pant-O-Jector is described herein. Using a beam of light to trace the profile on a special comparator chart not only indicates the form of the blade, but also locates it in relation to the center of gravity.

if wear should occur, it can be corrected very easily.

Obviously, the up and down motion and the across motion itself, cannot gage a blade. However, by placing a projecting arm on the sleeve and letting the end of the arm contact the blade surface, then as it moves across the blade, the end of the arm will guide the up and down. Another projection is placed on the sleeve, having the same shape as the end of the first arm, and it is the shadow of this arm that is projected on the screen. Whatever movement is made by the follower is also made by the projected end, and this is positive because the K and Y motion insures this result.

The follower that follows the blade profile should be a radius, and the shadow projected on the screen should be identical in shape and size. In the Pant-O-Jector a roller and a hole, or eye, is used, because whatever path the roller follows, the X and Y motion of the instrument guarantees perfect transmission of motion to the hole, or eye, and therefore, by following the path of the eye on the screen an accurate transcription of the blade profile is definitely seen.

One of the main features of the unit is that it can be used on standard comparators having a 14-in. diam or larger screen. Chordal lengths of average blades are from 1 to 2½ in. At 10 magnifications this would mean that the section lengths on the screen would be from 10 to 25 in. long on a 14-in. screen, but it is possible to split this line into two parts so that by positioning it properly it would represent one complete profile. In order to accomplish this, the unit has two, and in some cases three, eyes spaced according to specifications, usually exactly 1 in. from center to center. When proper coordination between chart-gage and fixture is obtained, one hole or ball may be seen on the screen as the roller starts to travel across the blade. However, as this ball approaches the edge of the chart-gage, another ball appears on the screen at the opposite edge of the chart-gage, and it will follow a continuation of the same profile the original ball was following. There are many variations of the Pant-O-Jector, all, however, follow the same identically sound principle.

Fig. 2 represents a model which can be used for checking one side of the blade at a time. The roller and the eye are both fastened to the vertical sleeve and through the X and Y motion the true path of the blade is described. It is designed to fit all standard comparators having 14-in. or larger diam screen. Although only two eyes are shown, replaceable brackets of one, two, three or more eyes can be used.

RIGHT

FIG. 4—Special double arm setup for simultaneously checking both sides of a turbosupercharger blade.

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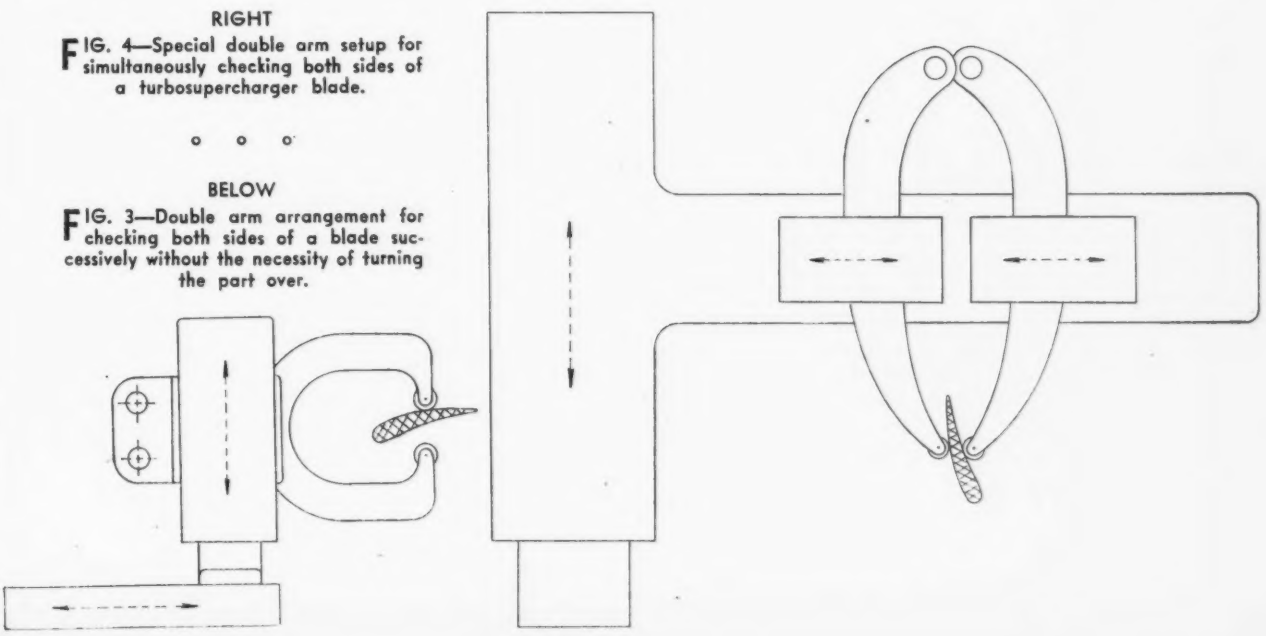
BELOW

FIG. 3—Double arm arrangement for checking both sides of a blade successively without the necessity of turning the part over.



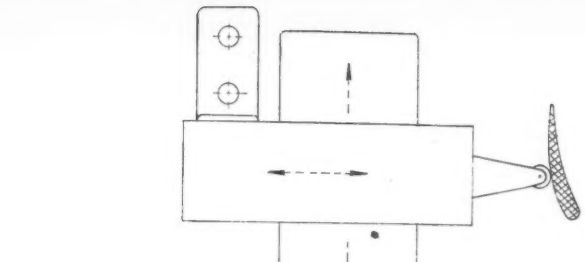


FIG. 5—Another variation of the basic Pant-O-Jector design which is particularly suited to the checking of dies.

Fig. 3 shows the same style Pant-O-Jector with the double arms which eliminate the necessity of revolving the blade 180°. It does not check both sides at one time, but is made to check one side when down pressure of the sleeve is applied, and the opposite side of the blade when up pressure of the sleeve is applied. In this case, a double eye bracket is used, and is required to have the same center to center spacing as the rollers. If this relationship were not maintained then the true sectional outline of the blade would not be checked, since spacing error would have the effect of showing the blade as being thick or thin. This unit can also be used on all standard comparators.

Fig. 4 is a unit for checking both sides simultaneously. The principle is the same. A cross beam moves up and down, and superimposed on this cross beam are two sleeves which move independently on ball bearings. Both have a light pressure applied so that they move towards each other, and thereby cause the rollers to remain in contact with the blade profile. Only one roller at a time can be used if desired. Fig. 5 is another variation of the same principle. This unit can be made to fit all comparators and is particularly suited for checking dies.

When using the Pant-O-Jector, the chart-gage has an outline exactly to drawing specifications. Prints on metal at a 1 to 1 ratio can be prepared, and by machining and filling to the contour line, an accurate template can be made. This same metal reproduction can be done at 10X and 20X and higher magnifications, so that they can be used in connection with profile grinders. Metal charts can be made to be used in connection with direct projection and, of course, transparency chart-gages in any quantity can be made from the same original accurate master scribing. Chart-gages made to be used in conjunction with the Pant-O-Jector are easy to check, simply by laying them over a universal grid chart and counting the squares to as many intersection points as required.

In the original design of the Pant-O-Jector it had been planned to use a fixed hole or eye as a follower. The eye can be in any convenient position, and the only requirement is that it be fastened to the same moving sleeve to which the tracer end is fastened. In further consideration of the problem, it was felt that if the eye did not follow the prescribed line, it would be desirable to shift the eye X and Y, and thereby find the correct position so that the eye would follow the line. This would mean that the form of that particular section is correct, but that its location is incorrect. This is a very common error since the blade profiles are uniform in shape, but due to excessive heat required in the forming operation, there is often a distortion caused by the cooling.

The moving eye feature has been used very successfully and its operation is simple. This is illustrated in fig. 6. By turning knob A, the eye moves laterally, and B moves the eye vertically, i.e., an X and Y motion superimposed on the X and Y movement of the instrument. When starting to check a blade the roller is pre-

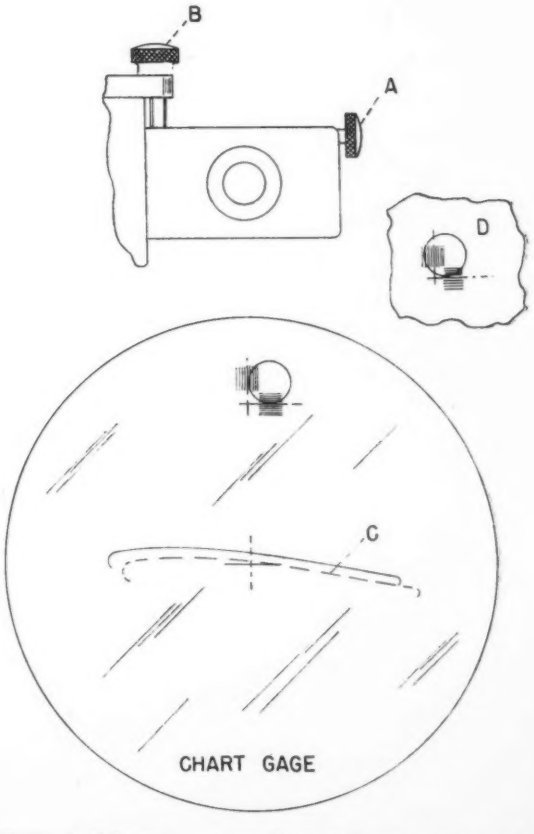


FIG. 6—Schematic outline showing the principle of the moving eye and the arrangement of the master set marks.

positioned in a set location of the fixture as shown in fig. 7. This set position is located properly with the work holding fixture, and is generally associated with the theoretical center of gravity of the blade. When in this set position the eye is moved into the set lines on the chart-gage as shown in fig. 6. The set position shown on the chart-gage is also located with the center of gravity of the blade outline shown on the chart-gage. If the blade is correct, the eye will follow the shape on the chart-gage. However, if the eye scribes a path shown by the dotted line C (fig. 6), for example, it appears that the shape is correct but the location of the section does not meet specifications. In order to determine this, the knob A is turned to move the eye to the left, and knob B to elevate the eye until the eye follows a prescribed path. It will then be seen that the shape of that particular section is correct; however, the center of gravity is not located properly. To determine how much off location the center of gravity ac-

tually is, the roller is dropped back into the original set position of the fixture and it will be noted that the eye has been moved as shown at D. It can then be determined by the scale, that the center of gravity has been displaced vertically 0.002 in. and horizontally 0.006 in.

Fig. 8 shows an actual chart-gage prepared for the inspection of a 1.5 wide, four-section blade. Two contour lines are shown for each of the four sections, one for top surfaces and one for bottom surfaces. Due to the width of the blade, 1.5 in., the full contour of any section would extend beyond the limits of the screen. For this reason the contours are broken into two overlapping sections coordinated to the center line distance of the two viewing eyes of the instrument. The upper and lower contours are further separated to eliminate any confusion from superimposed lines.

The small cross marks on each contour indicate the coordinate points which determine its shape. The length of each of these marks indicates the permissible tolerance at each point as shown in fig. 9. In the upper left-hand corner the two set master lines appear, flanked by scales of parallel lines. These scales represent the allowable twist of the blade and are read with the machine in setting position.

A number of the units built have been in the analytical class. There is a logical reason for this. Until the Pant-O-Jector was used there was little or no chance to study a blade. Template gages were the only devices used, and these are impractical from a standpoint of study. It is obvious that in order to improve a product it is essential to know exactly what the product is and to make corrections from there on. Analytical devices are therefore essential.

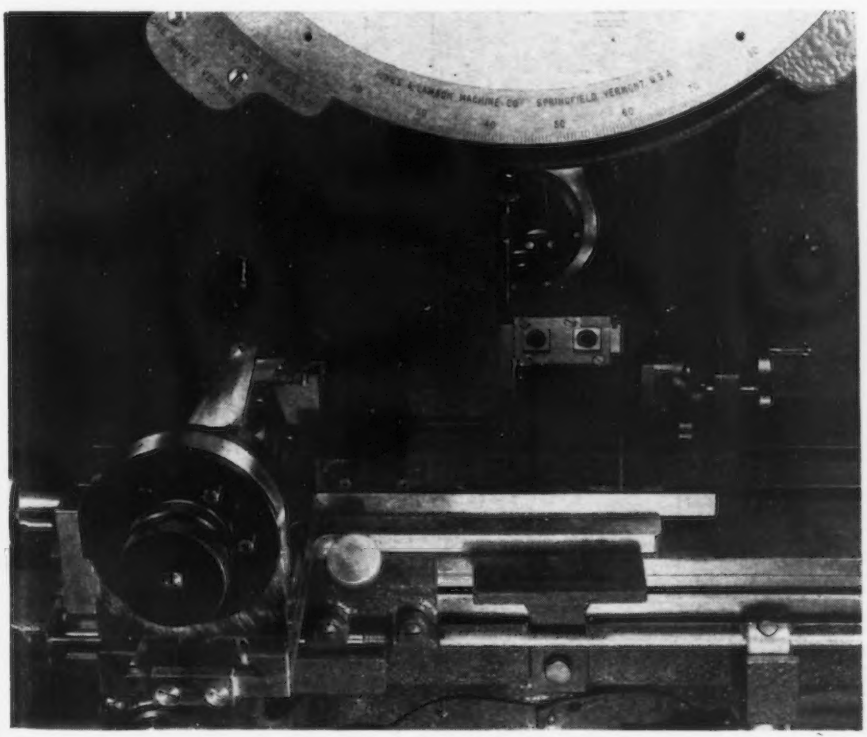
The use of the instrument, however, is not confined to the analytical class. It must be kept in mind that one of the principal reasons for using an analytical fixture is to study the blades and determine what variation can be expected due to forging or casting operations. Permissible variations in shape and position (center of gravity) can be determined at specific points along the contour.

From this, a chart-gage can be developed showing the tolerance lines. The blade is acceptable providing that the edge of the ball of light follows between the minimum and maximum tolerance lines. In actual practice, inspection by this method is very satisfactory. It leaves nothing to the judgment of the operators.

The fixture used for production inspection of finished blades is different and faster than the analytical type fixture. Indexing the blade from section to section is done rapidly and positively. Instead of a hand wheel and screw arrangement for operating the Pant-O-Jector, which is desirable when a study is to be made, a lever can be used on the production unit. Production inspection units for rapid inspection, used for checking one side of the blade at a time, incorporate a lever arrangement for rapid and positive 180° rotary index. Units to check both sides of the blade simultaneously are also supplied.

There is still another type of production inspection unit which has been designed and built. This unit is a logical answer to the problem of inspecting before any machining work is done on the root or dovetail. As explained by the various manufacturers, the blade profile, because of comparatively uniform cross-section, may vary slightly in form. Because of greater mass of material, the relationship of the root to the blade and the variations in the root itself is quite pronounced. The problem is to locate a working surface with relation to the blade profit, and then in subsequent operations, finish the root from this working surface. By this method only a minimum of operations need be done to produce an acceptable blade. A forged or cast blade has more than sufficient stock left on the root to take care of all variations in relative location of the blade. A blade holding fixture is designed so that the root is gripped in the locking jaws of the work holding cradle and while held in this manner the entire blade can be moved into any position. This is done in a ball-socket type holding fixture which permits angular positioning. It is also possible to obtain a rotary, vertical and horizontal motion. The unit checks both sides of the blade simultaneously. Having the chart sections positioned properly, the problem is, therefore, to move the blade into the correct profile without consideration of the root location. By means of the four adjustments, angular, rotary, vertical and horizontal, this can be done quickly. When the blade profile is thus in the correct position, a built-in drill in the fixture is used to drill a small center in each end of the blade, or two centers at one end and one at the opposite end. The center drills are prepositioned

FIG. 7—Prepositioning the roller arm on a master set block as shown makes possible the locating of a profile in relation to the center of gravity.



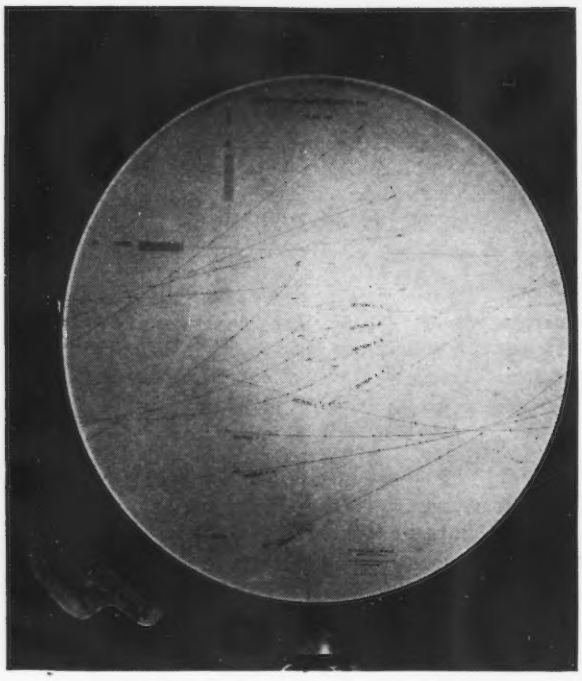


FIG. 8—Typical chart-gage prepared for inspection of a 1.5-in. wide, four section blade. To show the full profile on the chart, the lines are divided into two sections.

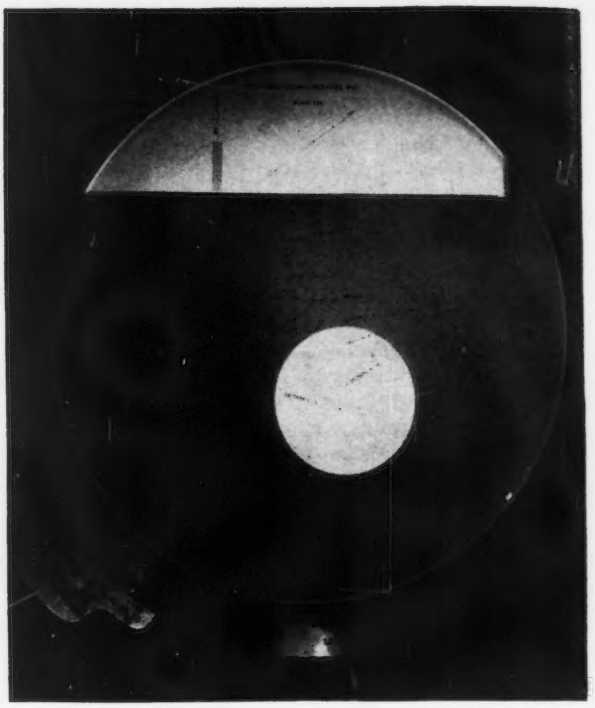


FIG. 9—Appearance of chart-gage during an actual checking operation. The edge of the ball of light can be seen following exactly one of the profile lines on which tolerances are also indicated.

in relation to the chart-gage, and these do not change location while the blade is being moved into the prescribed chart sectional layouts. The center drills have, therefore, established the center of gravity of the blade, and when it is removed from the jaws all subsequent operations are done with relation to those centers, the center of gravity of the blade.

Tinning Cast Iron

Procedures for tinning cast iron by use of the new fused salt baths are described herein. This new tinning process is said to result in better adhesion than the older methods and to give smoother and more continuous coatings. The data presented in this article have been made available through the courtesy of the Tin Research Institute, England.

CAST iron is tinned either to give it a clean, bright appearance and to provide a corrosion resistant and nontoxic surface, especially for food processing equipment, or to facilitate the adhesion of a white-metal lining as in bearings. Ordinary methods of tinning are unsatisfactory, because the surface of cast iron contains graphite and because the pickling acids attack the iron and leave a film of graphite sludge which prevents tinning. Moreover, owing to the slow cooling of relatively thick castings, there is ample time for the tin coating to retract into droplets.

To overcome these difficulties, entirely new procedures have been devised in which the articles are prepared for tinnning by immersion in fused salt baths. The new methods are summarized below.

Chloride Method

Mechanical cleaning—Machining, grinding, shot blasting or sand blasting may be used.

Stopping off—Areas on which tin is not required are painted with a thin wash consisting of magnesia ½ lb, water glass 1 pt, water ½ pt. This paste is allowed to dry on the casting.

Fused salt bath—As soon as possible after mechanical cleaning, the articles are immersed in a molten chloride bath (572° to 662°F) of the following composition:

Zinc chloride	82 parts by weight
Sodium chloride	18 parts by weight

The container for this mixture may be of welded Monel metal with Monel-sheathed immersion heaters or of cast Cronite which may be heated externally. Large or heavy articles should be preheated in an oven at 392° to 482°F before immersion in the salt bath. Such parts should be painted with an aqueous solution of the mixed chlorides to prevent oxidation. (This solution contains 2¼ lb zinc chloride and ½ lb sodium chloride to 1 gal of water, or 30 oz and 6½ oz respectively per U. S. gal.)

On immersion in the fused salt bath an envelope of

solid salt forms on the article, but this melts after 1 or 2 min, or more quickly if the article is preheated. A suitable time of treatment is 20 to 40 sec after the envelope has melted, as detected by moving the article in and out of the bath. The cast iron should not remain in the fused salt longer than the minimum time necessary to give satisfactory tinning. Over-treatment causes darkening of the surface and poor tin coatings result.

First tin pot—The castings are transferred to the first tin pot straight from the salt bath. The tin is kept at 572°F and is completely covered with a thin layer of the mixed chlorides (as in the salt bath) which is automatically renewed by carry over. The time of immersion should be at least 3 to 5 min, but longer times give better adhesion.

Second tin pot—This is kept at 464° to 482°F and is almost completely covered with palm oil, tallow or a mineral base tinning oil. This second dip is employed where a specially bright and corrosion resisting tin coating is required. For many purposes it is unnecessary.

Draining and Cooling—The tinned articles may be drained and cooled in air, or quenched in paraffin oil. Quenching gives a thicker and more brilliant coating and is necessary with thick sections of iron to avoid excessive draining and oxidation.

Nitrate Method

Mechanical cleaning—Same as for the chloride method.

Degreasing—Trichloroethylene vapor or hot alkali cleaner.

First pickle—Ten pct by weight sulfuric acid (inhibited with 0.5 g per liter of Stannine) for 30 sec at 185° F, or cold dilute hydrochloric acid (1 part commercial acid to 1 part water) for 2 to 5 min. Overpickling must be avoided.

Rinsing and drying—Rinse in water (preferably hot) and dry beside the tin pot or in a low temperature oven.

Salt bath—Immerse the article in a fused nitrate mixture of the following composition: (Note: Special care must be taken in using fused nitrates which react violently with organic materials.)

Sodium nitrate	1 part by weight
Potassium nitrate	1 part by weight

This mixture may be contained in an ordinary welded steel or cast iron pot and heated by gas burners or other convenient means to a temperature of 662° to 752°F. The article is immersed for 15 min, or longer in difficult cases. This treatment oxidizes the surface graphite and produces a film of oxide on the iron.

Washing—Remove nitrates from the article by washing in cold water.

Second pickle—The oxide film produced in the salt bath is removed by pickling in 10 pct (by volume) of commercial hydrofluoric acid in water for 1 min at room temperature. Rinse after pickling.

Tinning—Flux in a solution of 2¼ lb zinc chloride, ½ lb sodium chloride in 1 gal (1¼ U. S. gal) of water and tin as described for the chloride method.

Tinning by Wiping

A modified chloride method is used for objects too large to be dipped (such as marine bearing shells) and for tinning selected parts of articles (such as the insides of large pans) without extensive stopping off. The article is mechanically cleaned, as for the other processes, and degreased if necessary. It is then placed on trestles or on a hearth so that it may be heated. The surfaces to be tinned are painted with the mixed chloride flux solution (as used in the nitrate method) to prevent oxidation, and the article is heated to 518° to 572°F by gas burners or other means. Further flux solution may be applied if oxidation is observed.

An appropriate quantity of a previously melted mixture of zinc chloride (82 parts by weight) and sodium chloride (18 parts) is poured on to the surface at 572°F and washed over it for 1 to 2 min, rocking the article if possible. Any excess of chlorides is then removed and molten tin is poured on and wiped over the surface with steel wire brushes or scrapers. These operations should follow one another as quickly as possible. When tinning is complete, excess metal is drained off and the article allowed to cool. Flux residues are removed by washing.

Choice of Methods

To obtain tin coatings of the best possible appearance, the old established process of electrolytic iron plating on smooth, rumbled castings may be preferred and this process may also be used for porous castings.

The new fused salt processes are suitable for cast iron having carbon and silicon contents below 3.5 and 2.7 pct respectively. Annealed and very coarse gray irons should be avoided. When articles can be treated by total immersion, the nitrate method is the more flexible and reliable. It has the advantage that no special tank or heating equipment is required, although it involves a greater number of steps than the chloride process. The nitrate process gives the highest adhesion values and is therefore most suitable for tinning bearing shells. The chloride method is preferred for tinning by wiping and is satisfactory for dip tinning when the castings are sound and well cleaned mechanically. (With porous castings the flux may be retained in the pores and may sweat out after tinning.)

These new fused salt processes give better adhesion than can be obtained by the old methods, and the tin coatings are smooth and continuous and closely approximate in quality to hot-dipped tin coatings on mild steel.

Microfilm As An Engineering Tool

By E. S. KOPECKI
Metallurgical Editor

Although popular with office management for some years, the use of microfilm has only recently been accepted by the engineering department. The advantages of space-saving and dirt elimination have aroused the interest of the engineer and the metallurgist, with the result that many industrial plants have extended their use of microfilm. The experience of The Timken Roller Bearing Co. in setting up an extensive microfilming program is outlined herein as representing the versatility of the Recordak unit.

THE storage of old records has always been a problem to engineering management. Passage of time, of course, only aggravates the condition, in that the volume of information filed away seems to increase by leaps and bounds. Moreover, the records are invariably stored in a location unsuitable for any other purpose, to serve as a fire hazard and a medium for dirt accumulation.

To overcome these difficulties, the engineering department, following the lead of office management, has turned to the use of microfilm. At The Timken Roller Bearing Co., Canton, Ohio, where more than 17 million microfilm records have been made since 1942, it was found that about 98 pct of the storage space could be saved by microfilming certain records and destroying the originals. This space-saving feature is well illustrated in fig. 1, which indicates the space occupied by 3000 letters as compared with microfilm records for these letters.

Photographs used are not intended to describe actual operations at The Timken Roller Bearing Co., but merely to indicate applications typical of the uses of microfilm at Timken.—Ed.

This impressive performance was so convincing that engineering drawings and records and chemical laboratory heat analysis records were added to the long list of items microfilmed. Figs. 2 and 3 are representative of the results obtained. If duplicates of either the heat analysis chart or engineering drawings are desired, reproductions can be made with little difficulty. The heat analysis records, which list all pertinent information relative to each heat of steel melted, as well as its disposition, had accumulated for a period of over 20 yr. By microfilming these records, not only was the necessity for purchasing additional filing cabinets eliminated, but much needed space was released. The company plans to photograph heat analysis records at intervals of 5 yr.

Timken has found that by having records on microfilm it is possible to maintain a more orderly file and the possibility of losing documents is eliminated. By the use of a unit index and proper cataloging, microfilm is easily referred to and the perpetuation of each record is made possible. Fig. 4 is indicative of what can be done with a microfilm file. Further, by reducing the storage space 98 pct, the dirt accumulation and fire hazard have been correspondingly reduced.

The permanency of the film record compares very favorably with the better grades of bond paper. The Bureau of Standards has conducted exhaustive tests on the film now used and has determined that film processed according to its standard, and stored under its specifications, will have a life of from 300 to 500 yr. A company recently removed from storage film that had been processed 15 yr previously and found it to be in excellent condition—without having been subject to any special attention while in storage.

The initiation of a microfilming program, based on the experience of The Timken Roller Bearing Co., is suggested as follows:

(1) It is necessary to survey all company records and determine a retention period for each record.

(2) It would be well to design a small card form on

which the name of the record, form number, established retention period, and reference to other copies of the same form might be noted. The schedule for microfilming should also be noted on this card. Management's approval for the retention period and microfilm program of each unit card should be obtained.

(3) A catalog of records can then be prepared from the card file representing each record. It is suggested that each department or division be assigned a schedule number and all records be itemized under each schedule number. In this manner the catalog of records has no limitations as to future expansion. Each different type of record will carry a separate item number under its respective subject. Later the library of microfilm can be cross-indexed and filed according to schedule and item number.

(4) Several records which are known to be in chronological sequence should be selected to start on the microfilming program. It is well to keep a record of the date each box of microfilm is completed, the date marked for processing and the date received from the processor. This might prove valuable in later years in proving that microfilming was done in the usual course of business (hence the records would be acceptable in lieu of original records in court of law). It is also advisable to maintain a complete record of the dates original documents are destroyed.

(5) After schedule and item numbers have been assigned for each type of record, the schedule and item number should be noted on the box of film and each box of film should then be numbered consecutively, starting with No. 1, for each unit record. In this manner a microfilm index will be created which will show the schedule and item number—and each box of film will be properly identified for quick reference. The label on the box of film and the film index should show the box number, beginning and ending dates covered on each roll of film, and the first and last letter in the case of alphabetical records (or the first and last number of documents if they are arranged in numerical sequence). Each division manager or department supervisor should be supplied with a copy of his schedule of records. The schedule will show the retention period, and if the record is to be microfilmed, a suitable notation should be made thereon. A typical filing arrangement is illustrated in fig. 4.

OPPOSITE PAGE

FIG. 1—The roll of microfilm seen above on top of the stack of 3000 letters, contains images of every letter in the pile.

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ABOVE

FIG. 2—Heat analysis charts are one of the many technical forms which can be microfilmed and the originals destroyed, as a filing space saver, with the added protection for important records.

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RIGHT

FIG. 3—Mechanical drawings, reduced approximately 20 times on 35 mm microfilm, can be enlarged 23 times on a Recordak film reader for easy and quick reference, when checking measurements and clearances.

(6) The actual microfilm index should be controlled by one responsible employee. When reference to microfilm is required, the employee responsible for the maintenance of the microfilm index should obtain the film, place it on the Film Reader for viewing and be responsible for the return of the film to file.

As the volume of records increases, it will be found advisable to establish a schedule showing what records are to be photographed each month. Some records will require microfilming each month, others quarterly, semiannually, annually, and in some cases (due to the small volume) each 3 or 4 yr. The volume of each record will determine the frequency of microfilming and the schedule should be built up accordingly. As the program progresses, a graph itemizing each record to be microfilmed can be prepared. This will make readily visible the progress of each record and will also readily determine—should the question arise—which record should be microfilmed next.

It is desirable that a record of production be maintained while microfilming. By keeping a running record of the number of photographs of the various sized documents (recording equipment is provided with a counter) and the time required to photograph, it is possible to estimate the cost of any type of record. The costs at Timken vary from 0.3 to 3.3 mills, depending on the size of document. The average overall cost has been 1.6 mills per document, including cost of film, rental of machines and labor.

Each 100 ft roll of 16 mm film occupies a space 4 in. sq by 1 in. thick. The number of documents that can be photographed per roll varies from 8350 2½-in. documents to 1800 15-in. documents (the document is reduced 24 to 1). Drawings up to 37½ x 52½ in. can be microfilmed at reductions from 12 to 30 times in a single exposure and at a speed of 40 per min, see fig. 5.

The legality of microfilm records is briefly summarized by the Recordak Corp. as follows:

"For over 60 yr photographs have been presented as evidence in courts of law. During that time great progress has been made in both the science of photography and the equipment itself. Since microfilm records are complete and photographically accurate reproductions of original documents, their acceptance as legal evidence is rapidly becoming acknowledged throughout the country. Many states already have passed laws providing for the microfilming of documents and the subsequent destruction of the original; the microfilm copies being accepted in court. Also, in the U. S. Circuit Court of Appeals, it has been ruled that as proof of payment Recordak records constitute not secondary but primary evidence."

ABOVE

FIG. 5—Drawings up to 37½x52½ in. can be microfilmed on the Micro-File Recordak at reductions from 12 to 30 times in a single exposure and at a speed of 40 per min.

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LEFT

FIG. 4—A total of 96 rolls of 16 mm microfilm, with 3000 letters on each, 288,000 letters in all, can be placed in one drawer of a standard film file. The six drawers of the cabinet will hold 1,728,000 letters.

Small Precision Cold Strip Mill

Small self-contained Sendzimir precision cold strip mills capable of gage accuracies up to 0.0001 in. are described herein. These units are said to be especially suitable for rolling thin strip down to foil gages in highly work hardening alloys.

SELF-CONTAINED Sendzimir precision cold strip mills, of the type shown in fig. 1, are a small edition of the previously described Sendzimir mills and embody the same principles of design. According to T. Sendzimir, vice-president, Armzen Co., Middletown, Ohio, who developed the mills, these small units attain gage accuracies of ±0.0001 in. even on medium gages, which is much higher than with conventional equipment. They are ideal for economical production of thin strips, down to foil gages, if required, and even of the most highly work-hardening alloys such as stainless steels, nickel-chromium alloys and bronzes, because no intermediate anneals are required. Although these Sendzimir mills are comparatively small, speeds and reductions are high. Experience shows that a Sendzimir mill outproduces several conventional units when rolling metals or alloys which are difficult to cold reduce. The finished strip is flat with no camber or heavy center, and it has

[1] *See "Armco Introduces Sendzimir Mill,"* THE IRON AGE, *p. 55, July 23, 1942.*

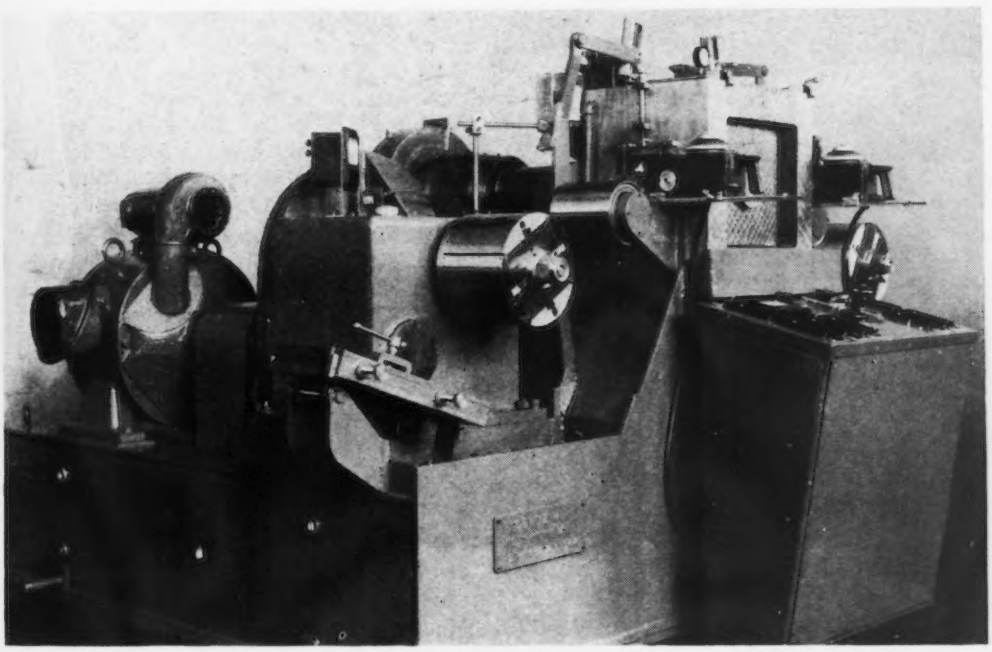

FIG. 1 — General view of the Sendzimir cold strip mill. Foundations are not required with this mill.

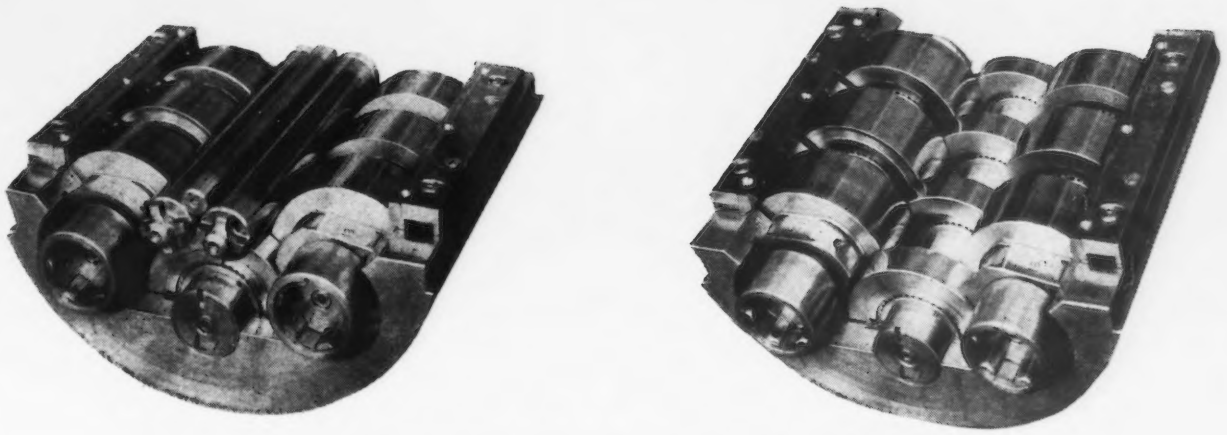

FIG. 2—Arrangement of the backing up elements showing the saddles and casters.

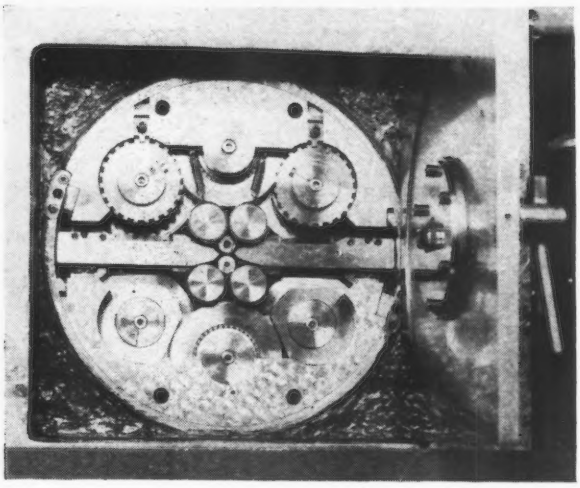

FIG. 3—Roll arrangement as viewed through a service door located just above the pulpit.

an excellent surface and smooth edges, without cracks.

The principal dimensions of this mill are as follows:

	Unit No. 15	Unit No. 16
Work roll diameter	7/16 in.	¾ in.
Intermediate roll diameter	1 in.	1⅝ in.
Backing bearing diameter	3 in.	4¾ in.
Maximum thickness of entering strip	0.045 in.	0.065 in.
Maximum widths of strip	8½ in.	8¼, 12, 15, and 18 in.

Work rolls as small as 7/16 in. and ¾ in. diam are used on the two small Sendzimir mill types. No conventional backing rolls are employed. Instead, each backing element consists of a dead shaft supported from the rigid mill housing, at frequent intervals, by fixed supports, or saddles between which are disposed roller-bearing equipped casters, as shown in fig. 2. These contact the four driven rolls that take up the roll pressure from the two work rolls. In this way the roll pressure is transmitted from any one place on the work rolls, directly to the nearest point in the housing. The housing is a solid steel casting, machined to close tolerances and to assure absolute rigidity. The work rolls, driven rolls and casters are not subject to any bending moments, as are the backing rolls on conventional mills.

Heat dissipation is no problem on these mills. Filtered lubricant is supplied under pressure uniformly to all caster bearings and, on leaving these, forms a bath of circulated lubricant around the rolls and the strip. In this way thermal dilation is avoided and close precision assured even with heavy reductions and at high speeds.

A rather desirable feature of the No. 15 and No. 16 type mills is that they are entirely self-contained units The mill housing, pinion stand, two winders, winder motors, and the mill motor are all mounted on one fabricated steel base (see fig. 1) which is also the tank for the lubricant. This feature can be appreciated by a plant engineer, for, if it becomes desirable to relocate the mill, the assembly can simply be moved as a unit. No foundations are required.

Operation of the mills is relatively simple, usually requiring only one man. The operator's pulpit is located directly against the mill, assuring close observation of the strip while rolling, and providing easy accessibility to the mill (see fig. 3). Either manually or hydraulically-collapsible winders can be furnished.

The small work rolls stand up surprisingly long between grinds because the roll separating force is so small. Only 0.0002 in. on the average is removed at each grinding and roll change takes only 1 min.

Electrodeposition of Cobalt and Nickel

A STUDY of a series of cobaltic ammines, one of the nickel ammines, and a few cobaltous ammines, from the viewpoint of their functioning as electroplating agents, is reported in the paper "Electrodeposition of Cobalt and Nickel from Coordination Compounds," presented at a recent meeting of the Electrochemical Society. The authors were M. D. Kramer, graduate student, S. Swann, Jr., research professor of chemical engineering, and J. C. Bailar, Jr., professor of inorganic chemistry, University of Illinois.

The data given in the paper suggest that the nature of the coordinating groups as well as the stability of the complex ions are important in determining whether good plates will be formed. Although ethylenediamine and propylenediamine complexes are of equal stability, the former give much better plates than the latter, which in turn give better plates than do complex ions of butylenediamine and stilbenediamine. This is evidently due in part to steric factors, but must be explained in part on the basis of changes in the reduction potential of the metallic ions. Solutions of complex ions of widely different pH may have satisfactory plating properties, while those of similar pH sometimes show very different plating properties. The effect of pH was said to appear to be of secondary importance.

Standards for Electrodeposited Coatings

A COMPILATION of standard specifications and tests for electrodeposited metallic coatings, prepared under the joint sponsorship of the American Society for Testing Materials and the American Electroplaters' Society, is available from ASTM, 1916 Race Street, Philadelphia 3, at $1.25 per copy.

The publication gives specifications for various types of coatings on steel and nonferrous materials; including nickel and chromium on copper and copper base alloys, and on zinc and zinc base alloys. Chromate finishes on electrodeposited zinc are also covered. Recommended practices for chromium plating on steel and for the preparation of low carbon steel for electroplating are given, and the salt spray test and tests for local thickness of coatings are described.

A New Method Of

Electrolytic Polishing Of Electron Microscope Samples

A new method of electropolishing metal surfaces so that replicas for use with the electron microscope can be duplicated is described. A feature of this process is the use of chilling to expand the pH range in which polishing can be observed.

o o o

By E. DER MATEOSIAN

Naval Research Laboratory, Washington

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SOLUTIONS commonly used as baths in the electrolytic polishing of metals either consist of mixtures of strongly oxidizing acids, with organic acids or alcohols, or consist of concentrated water solutions of the oxidizing acids alone. In an attempt to utilize the present techniques for the preparation of metal samples for the electron microscope, it was soon found that all the methods suffered from several distinct disadvantages, such as: Examination with the electron microscope showed the specimens to be etched; the polishing baths were quite specific in action for each metal, and some of the solutions were dangerous to prepare.

In order to learn how to prepare metal surfaces by means of electrolytic polishing so that replicas which could be duplicated could be made for the electron microscope, a study was made of the conditions which were essential for polishing. The outcome was a technique which has yielded surfaces which showed no structure at a magnification of 18,000, but merely a fine matte appearance.

Attempts at varying the established methods of polishing revealed that the following phenomena were always present when polishing took place: Relatively high current densities and passivity of the anode, formation of gelatinous films at the anode, or evolution of gases at the anode.

It has been established that passivity of the anode alone is not enough to cause the anode to become polished. Numerous solutions were found which caused passivity of the anode without forming a gelatinous film over the anode and in no case was polishing observed. As an example, a solution of 50 pct o-phosphoric acid in water at 68°F caused polarization of an iron anode, the break in the current-voltage curve occurring at 0.1 amps per sq cm in the particular apparatus used. No polishing was achieved for any value of current density.

A theory has been proposed by several experimenters[1] to explain the role of the gelatinous film in electrolytic polishing. It is believed that the film at the electrode solution interface hinders the solution of metal at the hollows in the anode and thus creates a preferential action upon any sharp points which may project partially through the film. Accepting this theory, the tentative hypothesis was adopted that

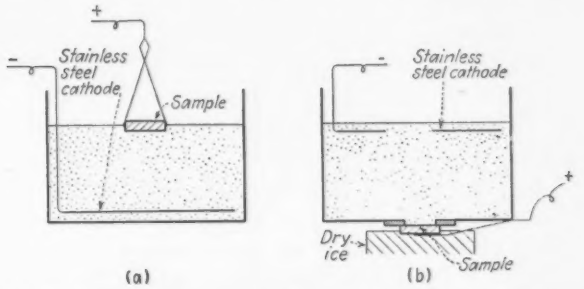


FIG. 1—Apparatus employed for electrolytically polishing samples. Sketch at (a) is method found most successful; method (b) is a variation which can also be used.

polishing of the anode would be encouraged if the tendency of the metal to go into solution was reduced as low as possible in order to exaggerate relatively any differential effect due to the film upon peaks and hollows. Although the current density had to be high to cause the formation of the film, the rate of solution of the metal could be reduced by controlling the pH of the solution by adjusting conditions to passivate the anode and by chilling the anode.

[1] *See "Comments on Electrolytic Polishing,"* THE IRON AGE, *Apr.* 11, 1940, *p.* 33.

To meet these conditions, it was required that the solution have a high ion concentration to carry the high currents desired and a controlled acidity to adjust the rate of solution of the metal. In addition, the solution should contain a water miscible, nonionized solvent in order to encourage the precipitation of the gelatinous anodic films and "concentration passivity," both effects being the cause of the preferential rate of solution of the metal from the peaks.

It may be noted that the baths mentioned in the reference have most of these properties. They consist of oxidizing acids under conditions which give a reduced ionization and an increased oxidizing effect, and many contain a water miscible solvent. One property common to all these solutions is that a single reagent performs several of the functions mentioned above. Obviously, if a solution could be mixed, in which each reagent performed only one of the duties required of the solution, each property of the solution could be varied at will, leaving the others unchanged. Needless to say, the freedom given the experimenter by this arrangement was highly desirable.

To this end a solution was made up containing 100 cc of ethyl alcohol (water miscible solvent) and 10 cc of saturated sodium nitrate solution to carry the current. As the solution was changed gradually from strongly acid to strongly alkaline by appropriate addi-

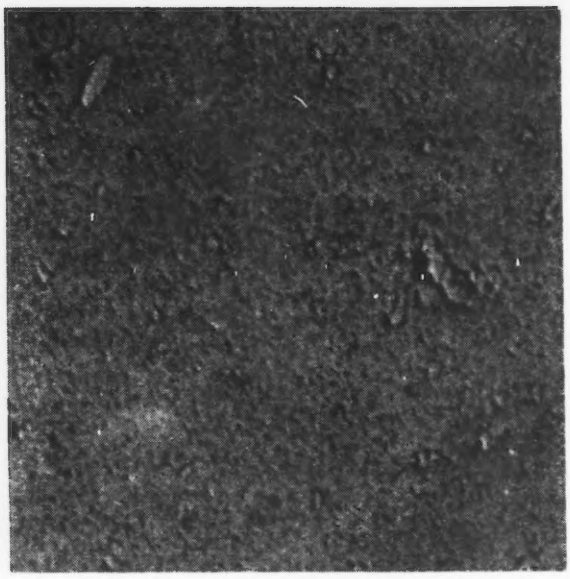


FIG. 2—Electrolytically polished pearlitic steel as "seen" by means of the electron microscope. X18000.

tions of nitric acid or sodium hydroxide, a pure iron sample was first etched, then polished and then oxidized and pitted. It was found that for a given current density the pH range in which polishing was observed could be expanded by chilling the sample with dry ice.

Many solutions were tried, with varying degrees of success, which were formed by combining together one member of each of the following groups:

Organic diluments: Methyl alcohol, ethyl alcohol, acetone, glycerine;

Salts: Sodium, potassium and lithium nitrates, sodium and potassium chlorides;

Acids or bases: Acetic, nitric, oxalic, citric, sulphuric and hydrochloric acids, sodium and potassium hydroxides.

The current density varied from 0.1 to 1.0 amps per sq cm. By this method the following metals have been polished: Iron, pearlitic, austenitic and martensitic steels, copper, brass, nickel, and aluminum. The apparatus employed was a simple one and is sketched in fig. 1 (a). Fig 1 (b) is a variation of this equipment which also can be used.

In fig. 1 (a) the solution is held in a convenient beaker in which is immersed a cathode of stainless steel whose size is at least ten times the size of the anode. The sample, which is held by a clip attached to the positive terminal, is pressed against a block of dry ice until well chilled and then quickly held with the area to be polished below the surface of the solution.

FIG. 3—Pearlitic steel electrolytically polished and etched with 1 pct nital. X18000.

TABLE I

Data for Electrolytic Polishing of Electron Microscope Samples

Metal	Solution	Current Density Amp per sq cm
Brass, Phosphor Bronze	125 cc ethyl alcohol 5 cc sat. $NaNO_3$ sol. 0.1 cc 1.0N NaOH sol.	0.2
Stainless Steel	75 cc methyl alcohol 15 cc sat. $NaNO_3$ sat. 0.1 cc 1.0N HNO_3 sol. or	0.5
	75 cc acetone 15 cc sat. $NaNO_3$ sol. or	0.4
	40 cc glycerine 10 cc sat. $NaNO_3$ sol. 10 cc H_2O 0.2 cc 1N NaOH sol.	0.4
Nickel	Same as the first for stainless steel	0.9
Aluminum	75 cc acetone or cellosolve 15 cc sat. $NaNO_3$ sol. 5-10 cc H_2O 1.0 cc 1.0N HNO_3 or orange to "Alkacid" test paper	1.0
Martensite	75 cc acetone or ethyl alcohol 25 cc sat $NaNO_3$ sol. enough NaOH solution to turn "Alkacid" test paper green or	0.4-0.8
	75 cc ethyl alcohol 25 cc sat $LiNO_3$ sol. or	2
	50 cc sat. NaCl sol. 50 cc glycerine (this solution gave a poorer polish than the other two)	2
Pearlite	75 cc ethyl alcohol 20 cc sat. $NaNO_3$ sol. 5 cc 5N NaOH sol.	1.5-2
	Buffered Solutions	
Stainless Steel	100 cc methyl alcohol 50 cc water enough sodium thiosulphate to saturate.	1
Phosphor Bronze	50 cc acetone 70 cc water sodium borate to saturate	0.15

The sample is removed after 5 sec, washed with alcohol and the process is repeated until a high polish is achieved. In fig. 1 (b) the sample is held by a spring clip against a gasketed hole in the bottom of the beaker and placed upon a block of dry ice. As polishing proceeds, the surface of the sample is brushed lightly with a camel hair brush to prevent the formation of a rippled surface due to gas bubbles adhering to the surface.

The general method consists of making a choice of salt and dilument and mixing up a solution in proportions which must be determined empirically. A satisfactory mix for most applications is 10 to 25 cc of saturated sodium nitrate solution and 100 cc of ethyl

alcohol or acetone. The sample is connected to the positive terminal, chilled and electrolyzed 5 sec, washed and inspected. If the sample is etched, a small amount of sodium hydroxide is added and the solution is tried again. If the sample is pitted and oxidized, some nitric acid is added and the process is repeated. A few trials will quickly indicate the proper pH to use.

There is a certain degree of flexibility in the method, for several of the conditions can be varied without destroying the polishing action. In general, the more alkaline the solution and the greater the current, the less cold need the anode be to obtain polishing. For some metals it is possible to find salts of weak acids or bases, as the case may be, which form buffered solutions with the proper pH to cause polishing. It is of theoretical interest to note that a solution from which the organic diluent was omitted, but which had instead a thickening agent (a few percent by weight of gelatine) also polished iron, but the surface was rough as the gases escaped with difficulty from the anode and the action was hindered. Specific examples of the application of this technique are given in table I. Figs. 2 and 3 are electron micrographs of samples polished as described in this article.

Acknowledgment

The author expresses his thanks to L. S. Birks who supervised the preparation of the electron micrographs throughout this research.

German Wartime Technical Developments

REPORTS of German practice in numerous technical fields of interest to engineers and executives in the metalworking field, issued recently by the Office of Technical Services, Washington, are briefly described below. These reports are in addition to detailed articles of certain phases of German practice previously published in THE IRON AGE. Copies of the reports listed below may be obtained in either photostat or microfilm form, as indicated. Orders for copies of these Reports should be addressed to Office of Technical Services, Department of Commerce, Washington 25, D. C., giving the "PB" identification number. See THE IRON AGE, June 27, p. 67, Aug. 29, p. 39, Sept. 26, p. 80, Oct. 10, p. 67, Nov. 14, 1946, p. 81, and Jan. 9, 1947, p. 64, for a list of earlier reports.

Ozalid Printing—An improved process of Ozalid printing is described in this report. For reflex copying, process is recommended for reproducing opaque originals, pencil drawings, old originals, blueprints, sepia prints, and maps. For projection printing, process is recommended for linework on ozalid diazo type paper and for halftone originals on ozalid light-sensitive paper. *PB-32587; photostat, $1; microfilm, $1; 7 p.*

Foundries—German iron and steel foundries in recent years have utilized from one-half to two-thirds of their total blast furnace slag, according to this report. Although German slag utilization practices are similar to those in the United States, German methods for making blast furnace cement with a high slag content and producing foamed slag may be of interest to American producers, the report states. *PB-34811; photostat, $3; microfilm, $1; 36 p.*

Kyanite Substitute—A synthetic material, artificial sillimanite, replaced Indian kyanite in the manufacture of mullite refractories in Germany during the war, according to this report by G. W. Josephson. It describes ingredients of the substitute and method used by Heinrich Koppers Corp., Duesseldorf, in preparing it. *PB-34809; photostat, $1; microfilm, $1; 11 p.*

Vanadium Recovery—Wartime shortage of vanadium as a steel alloy led the Germans to devise methods for recovering this metal from slag of bessemer converters, according to this report. *PB-4170; photostat, $1; microfilm, 50¢; 11 p.*

Vinyl Plastics—Recent German developments in the manufacture of vinyl plastics described in this report on the polyvinyl chloride industry. German techniques for rolling and finishing thin, flexible plastic sheets are described. Further data on German polyvinyl chloride, as well as on styrene products and plastic slide fasteners, are available in a second report (2). *PB-31253; photostat, $10; microfilm, $3; 146 p.* (2) *PB-34808; photostat, $3; microfilm, $1; 43 p.*

Molding Powders—Unusually bright and attractive colored molding powders were developed in Germany from phenol-formaldehyde, according to this British report. Based on resol, single-stage resin, powders are said to have superior mechanical properties and low water absorption, but have the disadvantage of surface darkening when exposed to sunlight. *PB-28887; photostat, $3; microfilm, $1; 31 p.*

Plywood Hinges—Manufacture of plywood hinges for fine quality furniture is described in this British report on German plywood firms. *PB-34018; photostat, $1; microfilm, 50¢; 11 p.*

Plastic Base Glue—A new plastic base glue, said by the Germans to be an excellent adhesive for all kinds of wood, developed for war uses at the Chemische-Werke Albert, Wiesbaden, is described in this report on the German high temperature coal tar industry. Among other developments described are an unusual continuous coal tar still, pitches, tar oils and related products. *PB-33270; photostat, $11; microfilm, $4; 165 p.*

Low Frequency Melting—Low frequency electric induction furnaces were used widely and successfully by the Germans for the secondary melting of aluminum and aluminum alloys, according to this British report. The report describes and evaluates the types of electric furnaces made by 14 of Germany's leading manufacturers. *PB-32566; photostat, $8; microfilm, $3; 111 p.*

Pin Making—A German pin making machine with special cam devices to keep the pin wire moving at even tension is described in this British report, which covers the manufacture of pins, bobby pins, and snap fasteners. *PB-32159; photostat, $5; microfilm, $2; 72 p.*

Reducing Processing Costs by Fu

By K. W. CONNOR and L. S. MARTZ
Micromatic Hone Corp., Detroit

TO CONTEND successfully with increasing material and labor costs, lower unit productivity, and at the same time continue to improve product quality, management now faces the need of adopting new attitudes in order to balance what to do, with how to do it. Profit or loss may easily be determined by a prejudiced decision to continue to use former methods and procedures with only minor changes.

In the face of today's unbalanced conditions, and in view of the obvious trend in the nation's political economy, management is challenged with immediate acceptance of radical change. For example, among those who have already adopted this attitude are several master mechanics who have already determined to find a way to use three machining operations instead of the prewar five or six. Also in this category are other production tooling executives who are insisting on more fully automatic equipment to reduce handling labor in loading and unloading work parts; still others seek to incorporate automatic work inspection during machining or processing cycles.

The development of the hone abrading process has kept abreast, and to some extent ahead, of this requirement. It now offers new opportunities for simplified processing, reduction of the total amount of metal machined away as chips as in former practice, and the possibility of revising overall machining process to reduce labor, time, and scrap costs. The full extent of this can best be gaged in comparison with prewar honing practice.

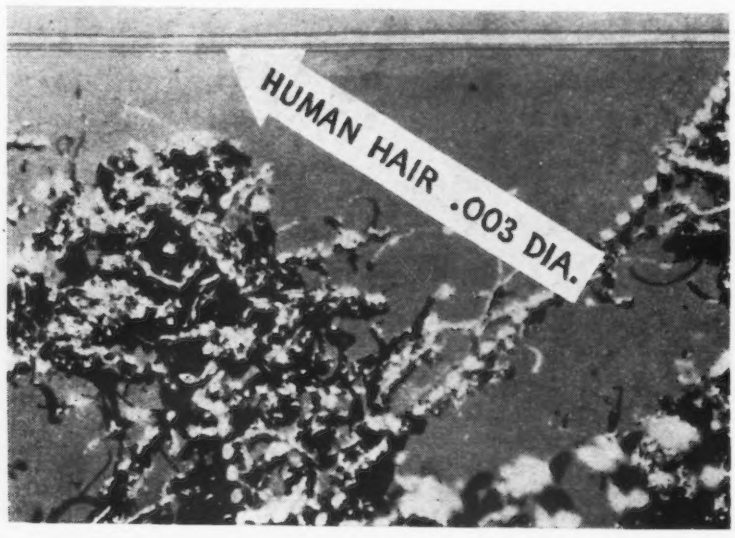
Originally conceived as a quick means for removing the upset metal burrs, called fuzz or scarf, produced by cylinder boring, reaming or grinding operations, standard honing practice in the past has served almost universally as a surface finishing process. It produced several desired results: It corrected errors resulting from previous operations; it generated dimensional and geometric accuracy for roundness and straightness within very low tolerances; it generated any desired final surface finish pattern or lay (direction and depth intensity of abrading marks or scratches), called functional Microfinish*, as related to the varied functional uses of the surfaces in service. Total stock removal was relatively small, and limited

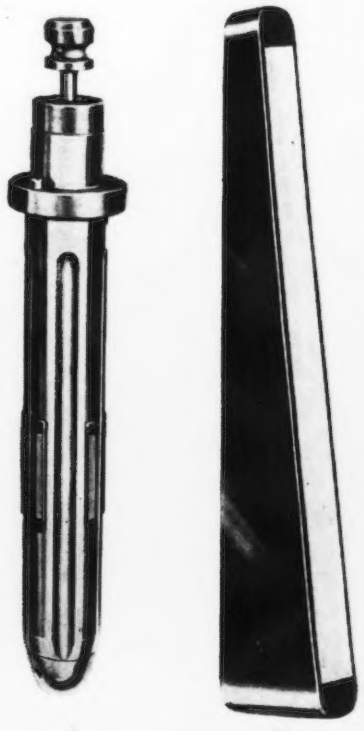
BELOW

FIG. 1—Typical chips generated in a honing operation on SAE 4130 steel tubing. Their size may be appreciated by comparison with a human hair.

RIGHT

FIG. 2—The new and simplified honing tool body shown at *A* has been developed especially for use with the new Micromold type of abrasive mounting shown at *B*.





Functional Hone Abrading

How manufacturing costs may be lowered by the more efficient use of a reduced amount of processing is described. As a result of several new developments in the honing field discussed in this article, it is possible to remove 25 to 30 times as much stock at rates of 10 to 12 times faster than was formerly considered practicable. Stone life has been increased as much as 1500 pct, and bore size can be held uniformly and automatically within 0.0003 in.

usually to the amount necessary to clean up errors, steps, chatter and tool marks in the bore. This procedure remains in present day use in many industrial applications.

Microhoning

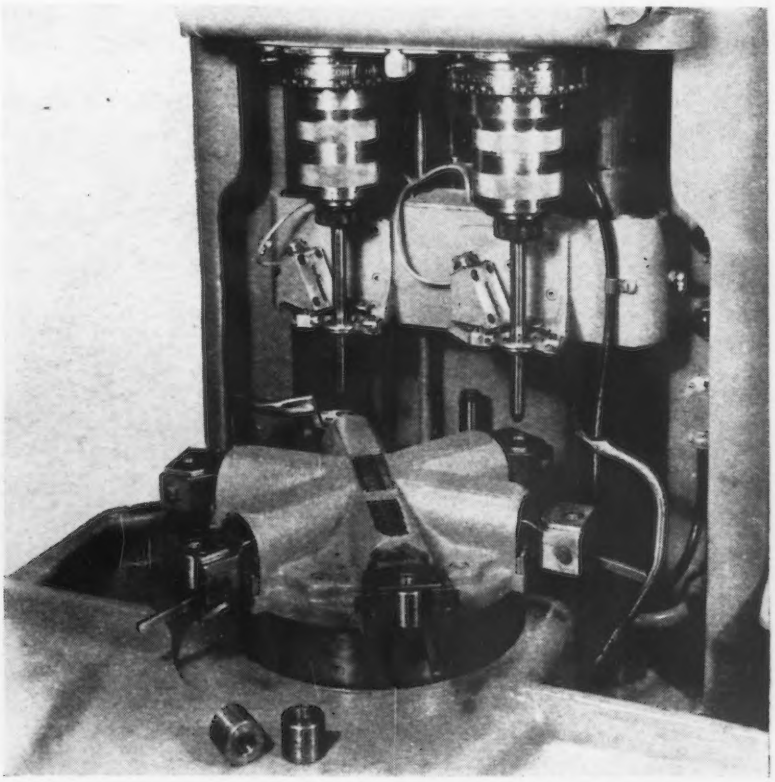
Today, under the urgency of rising costs, and conforming with the trend for more efficient use of a reduced amount of processing, Microhoning* now provides new economies in production as a result of several new, combined and inter-related developments. As compared with earlier honing practice, it is now possible to remove up to 25 or 30 times as much metal or stock, at rates up to 10 or 12 times faster than was formerly considered practicable, and with stone life increased upward in some jobs as much as 1500 pct. Bore size is held uniformly and automatically within 0.0003 in. Typical honing chips from a heavy stock removal application on SAE 4130 steel are shown in fig. 1.

These new developments comprise: Stronger slotted body tool construction, with reduction of total parts from 50 to 15 as shown at A in fig. 2; a new type of abrasive mounting in molded plastic, called Micromold* shown at B in fig. 2, with increased protection of the stone in use; and a new treatment of the abrasive bond, called Harzlite*, which consists of an additive substance deposited and hardened on the bond and bond posts which support the abrasive grains as shown in fig. 3.

This treatment permits use of a free-cutting vitrified bonded stone of soft grade, which, without treatment, would have excessive stone wear. It further permits controlled treatment to equalize hardness variations throughout the length of a honing stone. Since stock removal is in relation to stone wear, it is desirable to maintain uniform abrading effort by having a constant and positive feed-out of the abrasive during honing operations, a feature now available in the Microdial* control adjustment on Microhoning equipment. Accurate size control, within limits of

RIGHT

FIG. 4—Typical setup for honing small gear blanks in a Micromatic two-spindle honing machine.



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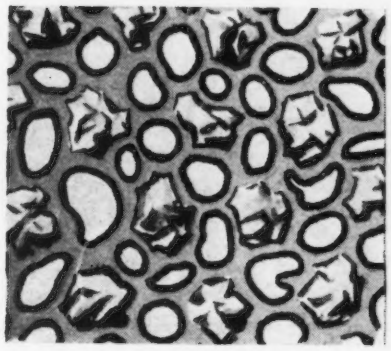
BELOW

FIG. 3—Use of a free-cutting, vitrified bonded, soft grade stone is made possible by the application of a treatment known as Harzlite whereby the bond posts receive additional support through a hard film as shown here.



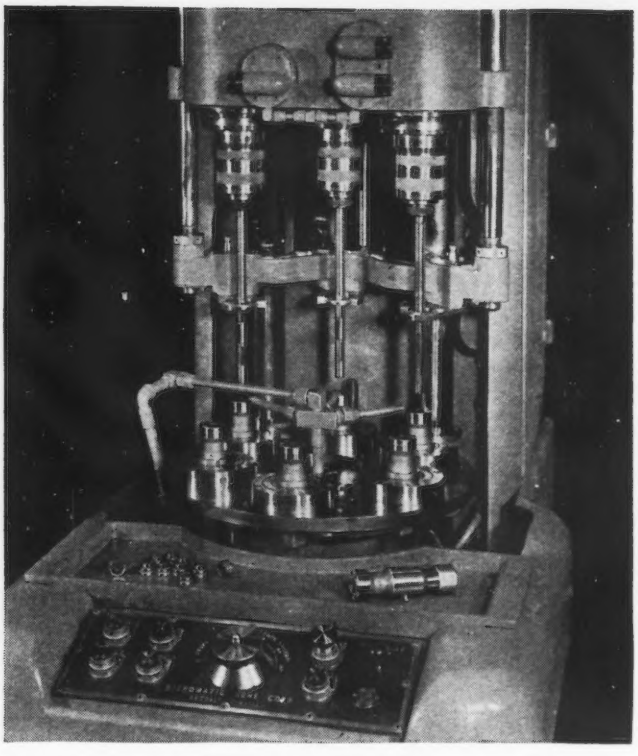


FIG. 5—Inner races of ball bearings, stacked in special shuttles, are progressively honed in this three-spindle Hydrohoner installation.

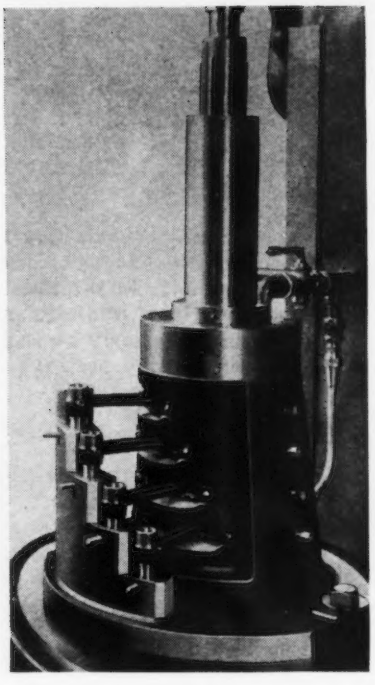


FIG. 6—This type of fixture has found wide use for honing connecting rods, four at a time, in many automobile plants.

0.0003 in. is now provided automatically by Microsize* attachments on Michroning equipment, and by Hydrosize* attachments on other makes of honing equipment.

** All words marked with an asterisk are trademarks registered U. S. Patent Office.*

The effects of this development are: Automatic control for uniform size, reduced machining operations in process, reduced scrap, more efficient technical use of the processing machinery, eliminating the need for selective fitting of parts in assembly, reduction of parts inventories required by selective fitting, and improvement of product quality in the operation of the assembled parts. All these developments make possible more efficient use of other machining as well as honing equipment in combined production processing.

Procedure

Usage of these new developments reflects a basic change of viewpoint about the best procedure in which to process a part. Microhoning controls are now based on the concept of:

(1) Generating an accurately sized, round and straight, precision honed bore, following a rough bore or screw machine reaming operation, with stock removal up to 0.030 in. on diam.

(2) Locating on this bore to generate an outside diameter or shape; followed by nitriding or other heat hardening treatments.

(3) Locating on this finished outside form, and final finish honing of the bore, with stock removal up to 0.003 in.

This is an important reversal of the long established custom in the metalworking industry. Its adoption during the recent war in production of an aircraft engine bearing reduced overall processing cost for the entire part by over 50 pct.

This procedure is essentially sound, since less critical physical factors, such as operating stability, bearings and cutting speeds are involved when there is a lot of room available in which to support machine and tool construction, as on the outside of a part, than when confined within the dimensions and shape of a cylinder bore. This opportunity for improved, lower cost processing is of particular interest to all manufacturers of gears and antifriction bearings.

The correct generation of a gear requires close precision control in order to generate true concentricity of the shaft bore and the pitch diameter of the gear teeth, with the bore accurately round and straight, accurately sized, and the shaft bore square with the end faces of the gear. Under former conventional procedure, requiring extremely high cost maintenance of machine spindle bearings, supports and motor drives, the teeth and pitch diameter have always been generated first, as location for the generation of the shaft bore.

In several typical installations, shown in fig. 4, this procedure is now revised as follows:

(1) In the green gear blank the bore is honed after finish boring. Stock removal ranges up to 0.002 in., accuracy for round and straight is held within 0.0002 in., and uniform size within 0.0003 in.

(2) Locating on this honed bore, the teeth and pitch diameter are generated.

(3) The part is then heat treated to desired hardness.

(4) Locating on the teeth or pitch diameter, the shaft bore is finish honed to final size removing from 0.0005 to 0.001 in. stock, generating bore accuracy within 0.0002 to 0.0003 in.

Similar advantages may be obtained in generating and processing the bores in antifriction ball bearing

cones (inner-races) with the same procedure. As presently being developed, fig. 5, this comprises rough honing the bore after screw machine reaming, correcting error for accuracy up to plus or minus 0.001 in. and with stock removal ranging up to 0.005 in. This is followed by:

(1) Outside processing with location on the honed bore, and generating the side faces square with the bore;
(2) Heat treating;
(3) Honing the bore, with location on the precision finished OD.

Crank pin (large end) bores are honed in connecting rods in 8 of the 20 makes of cars now on the American market, representing 53½ pct of total car production and 57½ of all automobile connecting rod production. Until very recently most of these honing installations have been using equipment, fig. 6, developed and introduced some years ago. Variance in opinions about processing procedure for connecting rods is evident in the following present applications:

Case A—Crank pin bore is rough and finish ground and one face reground to generate parallelism; bore is then broached, removing about 0.001 to 0.0015 in. stock; bore is honed with 120 grit stone for final finish of 15 to 20 microinches rms, honing 3 rods at a time; 4 loadings per min.

Case B—After assembly of broached cap and rod forgings, bore is reamed and ground, removing up to 0.007 in. Bore is honed, 4 rods at a time, removing 0.001 to 0.0015 in. stock with 120 grit stone generating accuracy within 0.0002 to 0.0003 in. for round and straight and 0.0005 in. for uniform size, at production rates up to 300 rods per hr per machine.

Case C—Crank pin bore is precision bored, leaving 0.001 to 0.0015 in. stock for rough and finish honing operations. Here, relatively smooth functional surface finish is desired as a bearing surface, since the bearing turns on the rod.

The latest installations, comprising multispindle honing machine and rotary indexing fixtures, as shown in figs. 7 and 8, are arranged to hone either one or two rods at a time at each spindle. In the lower production application, shown in fig. 8, 0.002 to 0.003 in. stock is removed following precision boring, in two honing operations, generating 0.0002 in. tolerance for roundness and straightness, 0.0005 in. for size, 25 to 30 microinch rms finish at rate of about 200 rods per hr. This machine is reported to be operating 24 hr a day.

In a rod application similar to that shown in fig. 7, two rods at a time are honed in each station, about 0.0015 in. is removed after precision boring, with accuracy and size tolerance as above, at rate of 250 rods per hr, and rejects for oversize within 3 pct.

The postwar trend toward reduced machining operations is already implemented in automobile engine cylinder bore processing. A recent survey shows 8 out of 19 makes of engine bores are completely processed in 4 operations, and 4 in 5 operations. A few cases of prewar 6 operations have now been reduced to either 5 or 4. All American manufacturers use honing in this processing to generate final accuracy and controlled surface finish.

A pilot application of a new Micromatic development, which will automatically and simultaneously generate uniform size within close limits in all bores in an engine block, is now being developed. This is a long sought objective in this industry. The tremendous economical advantage of eliminating the selective fitting of pistons and piston rings, and the reduction of parts in inventories and stocks all over the world is the incentive which makes pioneer users of this development determined to make it work in production. Engineers in several plants have reported substantial benefits resulting from honing wrist pin bores in pistons, by generating uniform size and better alignment of the bores.

Valve tappet holes and valve guides are now being honed, as shown in fig. 9, after assembly in the blocks

FIG. 7—Modern multispindle honing machine with rotary indexing fixture for high production. Rods are honed in pairs at a rate of 250 rods an hr.

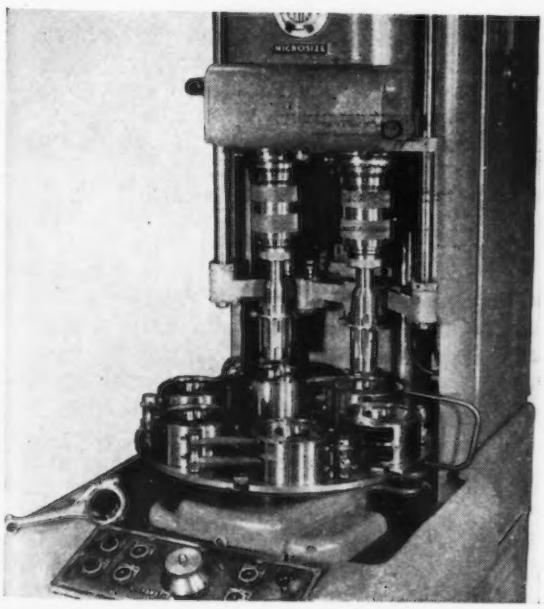
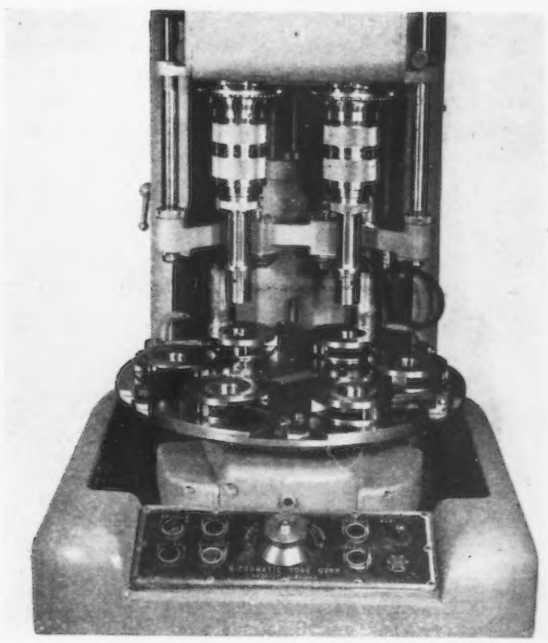


FIG. 8—A lower production honing operation in which rods are processed singly at the rate of 200 an hr to a 25 to 30 microinch finish.



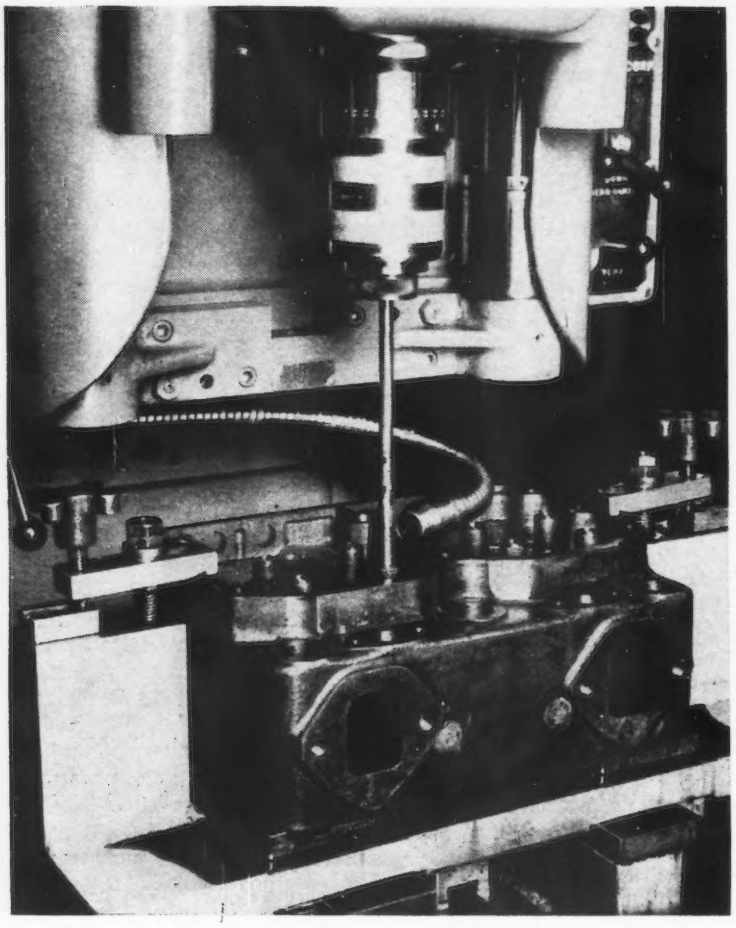


FIG. 9—Production installation of single-spindle, lateral indexing honing of valve guide and valve tappet holes in a diesel engine block.

of some automotive engines in other countries. These applications are considered very successful, particularly in relation to the assembly of parts in uniformly micro-sized bores.

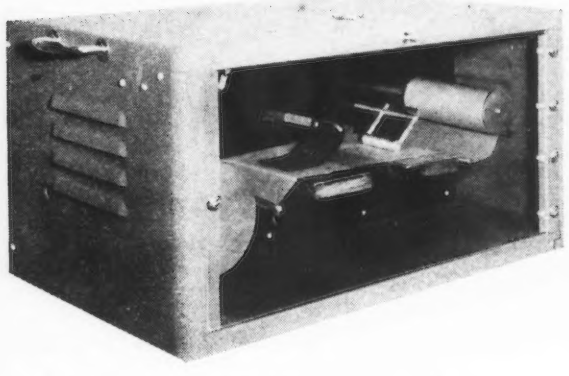
The processing of diesel fuel injector barrels by one American manufacturer now involves removing 0.004 in. to 0.005 in. stock in the green in about 1 min, hardening to 62 Rc, and finish honing, removing 0.001 in. in up to 1 min. Results are: For bow or straightness; 70 pct within 0.001 mm; 30 pct from 0.001 to 0.0015 mm; for taper 50 pct within 0.001 mm; 45 pct within 0.001 to 0.0015 mm; 5 pct within 0.002 mm; for size, 85 pct within 0.002 mm; all within 0.003 mm.

In another fuel injector barrel installation, 0.375 in. diam and 5 11/64 in. long bores have 0.004 to 0.0045 in. stock removed following gun drilling and reaming, generating straightness and roundness within 0.00005 in., in about a 70 sec cycle. Almost all bores are within 0.0002 in. for uniform size.

The examples cited here serve to emphasize the necessity for exploring new frontiers of ingenuity in production processing; that willingness to try what may have been considered impractical may now pay off in improved economy in manufacturing. The new honing developments reported here and their better technical use in combined processing, have contributed substantially and efficiently toward cutting costs while further improving quality.

Quality Control Instrument Detects Flaws

A NEW flaw detector which can continuously detect and count holes, weak spots and conducting paths in thin materials such as paper, sheet rubber, sheet mica, varnished cloth, plastic materials, and enamel films on wire during manufacturing operations has been announced by General Electric Co., Schenectady. The new instrument is shown in the accompanying illustration, permits quality standards to be set up close to the point of manufacture so that variations in quality can be quickly detected and correcting adjustments made with a minimum of waste. Applications include detecting places of low dielectric strength in insulating materials and holes in materials which must resist the passage of light or air.



ELECTRODE unit showing two types of electrodes for GE flaw detector.

The new flaw detector can be applied to sheet materials up to 0.025 in. thick moving as fast as 450 fpm and to wire moving up to 100 fpm. It consists of an electrode assembly through which an adjustable voltage is applied to the material undergoing test, and an electronic circuit which indicates the flow of current through the material which occurs when a flaw passes under the electrode. Electrodes have been especially designed for use with specific materials.

The new flaw detector can be made to sound an alarm, operate a recorder, or shut down the manufacturing process when flaws are encountered, and can be arranged to indicate when flaws exceed a given total. The control unit may be mounted remotely where an operator can read the counter or watch for flashes of a flaw-indicating red light.

Graphite Molds For Casting Vertical Steel Ingots

Experiences encountered by the Texas Steel Co. in producing a total of 538 steel ingots in a single vertical graphite mold (two-part design) are presented herein. In addition to the metallurgical advantage of producing steel with a more homogeneous structure than can be obtained with an iron mold, several economic advantages, such as reductions in (1) mold cost, (2) labor (stripping) cost, and (3) ingot surface conditioning costs, were also realized.

o o o

By S. W. HOUSE and T. KILLMAN

Foundry and Furnace Supt. and General Supt., respectively, Texas Steel Co., Fort Worth, Tex.

o o o

THE Texas Steel Co. recently arrived at the record number of 538 steel ingots cast in a single vertical graphite mold. This is believed to approach the maximum number of ingots cast in a vertical mold by any steel company in the United States and was accomplished with a material unusual in its capacity for forming steel ingots.

These 538 castings are in comparison with an average of 36 carefully selected, high quality ingots, possible in standard iron molds, and offer interesting possibilities of economy on ingot production operation costs.

Not only have a record number of ingots of varying carbon content and alloy combination been cast in this mold, but certain other factors which favor the use of graphite molds have been determined during the course of the record run. The advantages include (1) a complete immunity to stickers, since graphite does not deform upon being heated and is not wet by molten metals, (2) a uniformly better surface condition than is possible with cast iron molds, with much less cold lapping and elongated pitting, and fewer seams, (3) improved grain structure, showing substantially less to negligible center line segregation (ghost line) after polishing and etching, (4) higher quality steel, because it is unnecessary to use mold wash of any type, which means fewer inclusions and (5) no carbon pickup—for less than ¼ lb of graphite has been lost from the mold in the entire 126,000 lb of ingots cast in this mold.

The decision to attempt vertical casting with graphite molds resulted from an experience gained when a graphite mold plug was used experimentally in the bottom of an iron mold used for a 520-lb ingot. This plug was machined from scrap graphite electrode stock and gave such long life that it was decided to experiment with an entire mold fabricated of graphite. Arrangements were made with National Carbon Co., Inc. to design such a mold for an ingot 6¾ in. sq at the top by 4⅛ in. sq at the bottom by 31 in. long, casting a 233-lb ingot.

Mold Design

In designing the mold, the weight was determined by calculation of a heat balance such that the graphite mold surfaces, upon absorbing the heat of metal poured at approximately 2900°F and cooling to the extreme of equilibrium, would not exceed a temperature of 850°F on the outside surfaces (which is the critical point at which oxidation of graphite begins when exposed to air). Allowing for a portion of the ingot heat to be radiated from the mold surface, a mold weight of 1.4 lb graphite per lb of ingot was arrived at as an extreme minimum ratio, or preferably a ratio of 2 to 1. The larger ratio was chosen for its greater margin of safety.

The experimental mold was fabricated in identical half sections, although future ones for Texas Steel Co.'s production will be cut from single-piece blocks. Mold dowelling and clamping for this initial unit was accomplished by four stud bolts of 1 in. diam, which were run through the mold halves after perfect alignment of the cavity was made by the two halves, and the bolts were locked, in addition, to steel straps ¾ in. x 4 in. wide x 36 in. long. These straps served to protect the mold against bumping and rough handling, and provided a means for lifting the mold by a crane, see fig. 1.

Since the greatest wear is on the bottom of the mold cavity, a replaceable bottom plug was provided so that the entire mold would not need to be discarded when bottom wear became excessive.

Two different bottom plug designs were tried. One was perfectly flattopped, the other had a well, 2½ in. in diam and 2 in. deep, drilled into its top. The reason for the well is that liquid metal causes erosion when it impinges upon the graphite bottom at the start of the pour. As soon as the bottom of the mold cavity is covered with hot metal, erosion of the gra-

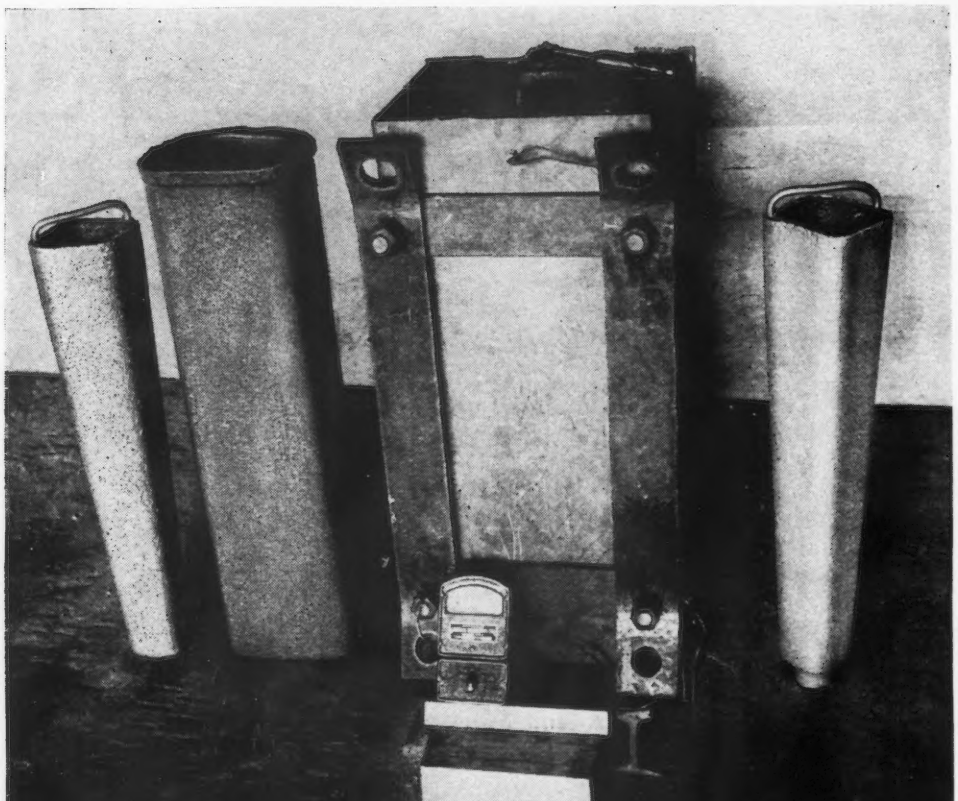


FIG. 1—A comparison of cast iron and graphite vertical iron molds is shown with the ingots cast from each. The cast iron mold and its ingot are at left, the graphite mold (with temperature recorder) and ingot cast from it at right.

phite ceases because this pad of metal absorbs the impact. In a 2½-in. diam well, the pad forms in one third the time required for the formation of a pad in a 4⅛-in. sq of the same thickness, and, bottom erosion will be correspondingly less—assuming that the metal stream always hits within the well. Moreover, the erosion is confined entirely to the replaceable bottom plug.

Another and possibly more important reason for the well is that it eliminates wall erosion caused by splashing from the bottom, the splashing being confined instead to the wall of the well in the plug. This serves to lengthen the life of the mold walls at the expense of the low priced plug.

Heat Transfer

In the first 5 days of mold operation, a large number of temperature measurements were taken to insure that mold weight design was correct and that oxidation of the graphite surfaces was properly avoided, which meant that outside surfaces had to remain below the critical 850°F temperature.

Three thermocouple tips (iron-constantan) were firmly planted within the mold at the following locations: (1) 1 in. down from the top surface and 1 in. away from the cavity, (2) 2 in. down from the top surface, 1 in. in from the side wall, and 4 in. away from the cavity, and (3) 4 in. up from the bottom surface, 1 in. deep from the outside wall, and 5 in. from the cavity bottom.

In addition to checks at these three locations, several spot checks were made with a surface thermocouple, and it was definitely ascertained that location No. 1 represented the highest mold surface temperature that would be encountered and hence would govern design. Also, for one ingot, a thermocouple was placed about 1 in. deep from the bottom of the bottom plug. The temperature here was almost exactly equal to that obtained from location No. 3, and it was therefore concluded that location No. 3 was the coldest spot on the mold. It was further observed that there is about a 100°F lag at location No. 2 from the temperature in location No. 1, but in 9 to 12 min. after pouring, the two temperatures become about equal.

Mold temperatures resulting from one representative poured ingot are listed in table I. It will be noted that the ingot remained in the mold long enough to assure that the graphite surface temperatures would never exceed 750°F, but would remain well below the limitation of 850°F no matter how long stripping might be delayed. After 17 min, maximum surface temperature actually started to fall off, which meant that heat still being given off by the ingot was radiated from the graphite surface as fast as it was absorbed by the mold. When the ingot was stripped, it was still cherry red in color, indicating that its temperature still was far from equalization with the mold temperature.

These tests illustrated the remarkable black body effect of graphite and bore out what the Texas Steel Co. calculations had indicated—that graphite has two to three times the heat conductivity of iron, and that 500 lb of graphite has considerably greater heat absorption ability than 525 lb of iron.

In one comparison of the graphite mold with an iron mold, the maximum graphite surface temperature

TABLE I
Mold Temperature Variation at Various Locations

Time, Min.	Temp. No. 1, °F	Temp. No. 2, °F	Temp. No. 3, °F	Comments
0	300	300	300	Ingot poured
2	600	500	400	—
7	710	640	480	—
12	740	710	520	—
17	750	730	550	—
22	740	720	560	—
27	740	720	570	—
28	740	720	570	Ingot stripped

at 2 min was 600°F and the iron temperature only 420°F, while at 9 min after pour the graphite was 740°F and the iron mold surface was cherry red with a temperature of about 1100°F. Surface temperature of an ingot stripped from the graphite mold in 6 min was about 2000°F.

Stripping

In many tests of comparative stripping time between graphite and iron molds starting at room temperature, ingots were stripped from the graphite mold in 2 min against a minimum stripping time of about 15 min for new iron molds.

On one occasion when the temperature of the mold was 520°F 5 min after pouring, the ingot was stripped, and 3 min later a second ingot was poured. The starting mold temperature for this pour was 460°F, and it rose to a maximum temperature of only 790°F. The ingot was left in the mold 17 min, after which a third pour was made inside the 25-min ladle cycle standard in the plant, and the mold still held under its critical 850°F surface temperature. The Texas Steel Co. is satisfied after repeated tests that two to four pours per heat can be continued through four heats at 2-hr intervals, without resorting to spray cooling of the mold between heats.

Carbon pickup from the graphite mold is virtually nil, as is evidenced both by the small amount of graphite missing from the mold after 538 casts and by repeated laboratory checks on the carbon content before and after pours. Data on five typical heats chosen at random from the files, table II, show a comparison of ladle analyses with laboratory analyses of such ingots.

Graphite Liners

Some consideration had been given initially to the possibility of using graphite liners within a steel or iron shell, but in a spot check on simultaneously recorded temperatures of the graphite side wall surface compared with its adjacent ¾ in. steel frame, the graphite surface was 575°F at 14 min after pour while the steel frame surface was only 440°F. Initial temperatures for both had been 120°F, so the increase for the graphite was 455°F as opposed to a steel increase of only 320°F. This difference indicated the existence of a substantial heat dam at the interface between the graphite and the iron, and since elapsed time was 14 min and the steel thickness only ¾ in., this difference could not be accounted for by the lower conductivity of the iron. Inasmuch as the steel plate was bolted very firmly to the graphite mold, the insulation value of any substantial air gap between the two materials must also be minimized. The apparent conclusion is that a light weight graphite liner within a steel or iron shell may not be effective for producing a quick chill of the ingot, and a protective pad of metal may not form as quickly as in a full weight all-graphite mold. However, additional tests are planned to determine by actual service if graphite-lined cast iron molds are practical.

TABLE II

Comparison Between Carbon Content in Ladle And In Ingot

Heat No.	Ladle Analysis (carbon), Pct	Ingot Analysis (carbon), Pct
3567	0.22	0.20
3569	0.20	0.20
3570	0.32	0.33
3583	0.35	0.35
3585	0.24	0.25

Test Procedures

The mold as first set up was provided with a flat-topped bottom plug, but upon stripping the first ingot, it was found that several fins of metal extended from the ingot bottom as a result of metal running down the spaces between the mold and the bottom plug. These fins were not objectionable in themselves, but since they were tapered inward they tore bits of graphite from the bottom plug. After several tries at pounding the plug into place and trying different plugs of the same design, the problem was solved by chalking a welled plug in the seat and sandpapering

FIG. 2—The macrophotographs of cuts from corresponding levels of low carbon steel ingots cast in the graphite mold (left) and in a cast iron mold (right) serve to illustrate the finer and more uniform structure that results from the quicker chill obtained in the new graphite mold.

off the high spots indicated. When a near perfect seating was obtained, ingots were produced with no finning. After the first five castings the flat-topped plugs were discarded in favor of one containing a well.

National Carbon Co. welding paste was used to fill a few minor irregularities in the parting line of the mold and a few pits in the graphite surfaces, but the two-piece design of the mold provided the only basic reason why patching was needed, for some degree of wear was inevitable along the parting line after a few hundred pours. This will be corrected in the one-

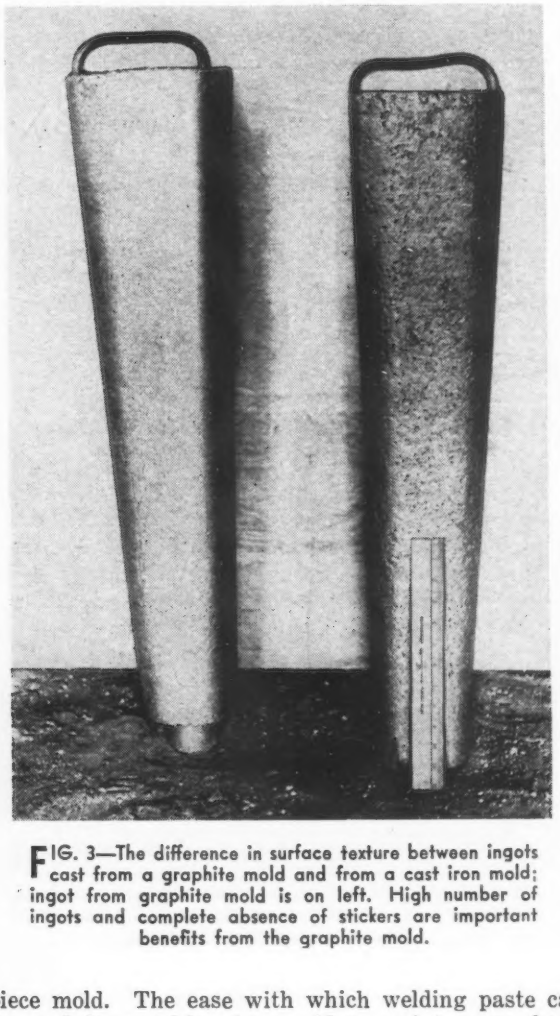


FIG. 3—The difference in surface texture between ingots cast from a graphite mold and from a cast iron mold; ingot from graphite mold is on left. High number of ingots and complete absence of stickers are important benefits from the graphite mold.

piece mold. The ease with which welding paste can be used for patching is an aid to maintenance, however, for it attaches firmly and leaves a smooth, satisfactory surface after sanding.

Performance History

Pouring of 0.20 to 0.25 pct C steel began Sept. 17, 1945, under the direction of the authors and H. L. Larson of National Carbon Co., Inc., who designed the mold. Subsequent heats poured in the mold have included SAE 4640, 4120, and many low to high alloy nickel, chromium, molybdenum and manganese combinations.

After 29 pours the inside surface of the mold was remarkably smooth and completely free from any apparent oxidation. A patch, in a small fault about ½ in. long by 1/16 in. deep and ⅛ in. wide, which had appeared after the second pour and was filled with carbon welding paste, was still in place; and paste was used at this time to fill in the parting line so as to forestall ribbing. The surface condition of the 29th ingot was just as good as the first one poured and made excellent comparison with those cast in iron molds, showing less pitting and far fewer cold laps.

A comparison of the grain structure of one of these ingots with a similar ingot from an iron mold was made by sawing the ingots longitudinally and then in 5-in. lengths, and etching the surface with 50 pct HCl. The ingot metal produced in the graphite mold (fig. 2a) showed a line segregation substantially less than that produced in the iron mold (fig. 2b) with a more homogeneous structure. This characteristic is attributed to the more uniform cooling in the graphite mold. After 64 casts the ingots were still breaking clean and had surface texture equal to any of the first 10. The interior of the mold had become discolored by scorching and had lost its ultra-smooth machined surface, but this did not affect the surface of the ingots. A slight wearing away had occurred at the junction of the two halves near the bottom of one side, but the resultant fin was not large enough to cause any gouging of the mold when it was stripped. The mold plug showed signs of wear on one side, however. At 87 casts the same plug was still in use and no further mold wear was in evidence beyond a slight amount at the parting line between the two halves.

At 181 pours the mold plug was removed. As a result of its careful fitting it had lasted for 176 pours (75 to 100 pours per bottom plug were averaged for the remaining life of the mold).

Erosion to a depth of about ⅛ in. had now taken place on the bottom ¾ in. to 1 in. of the cavity wall above the mold plug. This was sanded down and the new plug cemented in.

After 250 pours the mold was dismantled and the inner surfaces completely smoothed with sandpaper. Recent ingots were weighed and measured and showed no increase in weight or size. Ingot surfaces were still superior to those obtained from cast iron molds, and at 371 ingots these conditions still obtained. Fig. 3 indicates the difference in surface texture between an ingot cast in a graphite mold and an ingot cast in an iron mold.

When 450 ingots had been reached, it was apparent that the mold was approaching its elastic limits. Casting was finally discontinued after the 538th full ingot had been poured. This was due in part to the deliberately rough treatment the mold had sustained, to test the abuse it would withstand, and in part to the fact that from 30 to 50 unrecorded casts (excess metal) containing slag had been poured into the mold. These additional pours were not counted in the total number of casts made, but the effect of the slag undoubtedly contributed to the erosion. The chief factor in mold debility, however, was the two part design, for in the opinion of Texas Steel Co. production men, the new solid one-piece molds (when properly set up in a production line) should be able to handle 1000 pours per mold.

Economics

A number of points enter into calculation of the economic advantages favoring graphite molds. Of first importance is the percentage of reduction in the cost of ingot molds per ton of metal cast. With this first experimental mold, a reduction in mold cost of 77.4 pct was realized, for although the graphite block had an initial cost four times that of an iron mold, it accommodated 14 times as many ingots. Every ingot after the 144th contributed to its percentage of sav-

ing on its expense. On this basis companies which cast 60 or 75 ingots per iron mold should reduce mold costs 50.7 or 38.4 pct, respectively.

Second in importance is the time and labor involved in stripping. Side by side in the plant today, ingots from the graphite molds can be stripped 30 pct faster than those from iron molds, and with a new pouring arrangement planned for use upon delivery of enough graphite molds to care for the plant's entire production, it is estimated that stripping time will be cut 90 pct, with fewer molds on the line, and 60 pct less labor. The cost of mold wash can also be eliminated, since there is no need for it with graphite molds.

In this plant the pit men attend to stripping, mold wash and the setting of bottom plugs. As any plant production man knows, stripping stickers with a 16-lb sledge is hard work and hot work, one of the toughest jobs in the mill and the hardest place to keep men. Anything that can relieve this situation will reduce labor turnover. Graphite molds may supply the answer, for in all the 538 castings made with this experimental mold there was not a single sticker. The average is 5 pct stickers in cast iron molds.

Plant practice is to set stickers aside until the week's run is out of the way and then knock them out on Saturday or Sunday, which requires the services of a craneman and two pit men on time-and-a-half to double-time pay. With graphite molds this extra expense will be eliminated.

More enters into the sticker problem than labor alone, however. Too frequently, by the time stickers are stripped, the heat has been processed, and it is too late to include the ingots in the run. Thus their usefulness is gone and the expense that went into the preparation of special heats is lost and the ingots are dumped into a miscellaneous pile. Or often the identity of ingots from the most expensive heats is lost in stripping and they must be used in cheaper products where the value of the expensive heat is dissipated.

The third factor that deserves attention in an economic appraisal is the improved surface condition of the ingots, which reduces conditioning costs preparatory to rolling. This expense is mainly in labor and in oxygen for scarfing.

Automatic Continuous Heat Treatment

SAVINGS in space, time, labor and fuel, with uniformity of product treatment, are demonstrated in a recent installation made by W. S. Rockwell Co., Fairfield, Conn., in a drop forging plant, for automatic continuous heating, quenching, washing and drawing of assorted steel forgings.

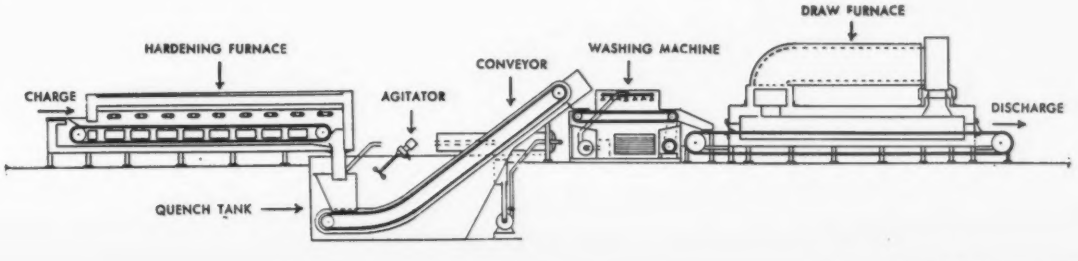
To meet the specific plant requirements of the user, the equipment, illustrated in fig. 1, was arranged in the form of a U. This placed the furnaces in two parallel lines so that the finished work is discharged near the loading end. Production calls for 800 to 1000 lb of assorted forged sockets, handles and miscellaneous wrench parts, as well as other items ranging in weight from several ounces to 1½ lb.

The work is placed on an apron on the charging vestibule and pushed slightly forward so that it is fed constantly onto the conveyor belt of the heating furnace. This is the only manual operation until the forgings are removed in tote boxes after they drop from the discharge end of the draw furnace. The belt rides through the furnace on top of gas-fired radiant boxes, forming the underhearth heating elements. This permits direct radiation and conduction to the conveyor and its work load.

In addition, gas-fired hairpin-type radiant tubes are located above the belt so as to give uniform heat distribution throughout the length of the furnace. Temperature and burner control equipment includes a recording potentiometer and automatic safety shut-off valves for air and gas supply. For surface protection of forgings, a controlled protective atmosphere is introduced into the furnace from an atmosphere generator located beside the furnace.

From the heating furnace, the forgings drop off the conveyor belt through a chute built inside the furnace structure and through a chute extension immersed in the quench tank into the oil bath. The oil quench tank has a perforated flight conveyor belt which takes the work from the apron in the quench tank immediately below the furnace discharge chute and carries the pieces out of the tank. The tank is equipped for steam heating to raise the temperature of the oil before running work through, as well as an automatically-controlled cooling unit.

From the quench tank conveyor the work moves through a chute and onto a belt conveyor through a washing machine, which removes oil from the pieces, which are then directed to the charging end of the draw furnace. The draw furnace is heated by recirculating hot gases which are blown down over the work at the discharge end of the furnace and circulated over the full furnace chamber so as to expose the charge uniformly to the hot gases. The hot gases are produced by atmospheric-type gas burners firing into an air heater, from which they are pulled by a fan and introduced through a duct into the draw furnace and then recirculated back to the heater.



10,000 Trade Names

. . . A third section of the Trade Name Directory, compiled by The Iron Age as a ready reference for engineers and business executives, is presented herewith. The first section of this directory appeared in the Annual Review Issue of Jan. 2, p. 172; the second appeared Jan. 9, p. 65. This directory tells what a trade name covers, its composition if a material, where or how it is used and the full address of the manufacturer or supplier.

Esna: Self-locking elastic stop nuts that protect permanently against vibration, corrosion, thread damage and liquid seepage; over 2500 different types and sizes. Elastic Stop Nut Corp. of America, Union, N. J.

Esso Bond: Plastic airsetting refractory mortar for laying and wash coating fireclay brick from back up duty up to and including superduty firebrick. Ramtite Co., 2563 W. 18th St., Chicago 8.

Ethocel: Ethylcellulose for making durable molded products in wide variety and protective packaging. Dow Chemical Co., Midland, Mich.

Etiral: Tough and hard 10 pct Cr steel for wire drawing dies. Soc. Anon. de Commentry Fourchambault et Decazeville, Paris, Frahce; R. Y. Ferner Co., Investment Bldg., Washington.

Eureka: Plain-carbon steel for machinery parts. Columbia Tool Steel Co., Lincoln & State Sts., Chicago Heights, Ill.

Eureka: Clear, colorless water solutions, used for general soft soldering and solder and lead-coating fluxes. E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del.

Eureka: Tool and die welding electrodes; also available for atomic-hydrogen welding and for welding heat resisting metals, bronze, copper, copper-nickel, cast iron. Welding Equipment & Supply Co., 223 Leib St., Detroit 7.

Eureka Tempering Oil: Extra-heavy bodied oil suitable for continuous use in tempering oil baths at temperatures up to but not exceeding 525°F. Standard Oil Co. (Indiana), 910 S. Michigan Ave., Chicago 80.

Eutechrom: Welding rods and fluxes for building up new or worn surfaces subject to abrasive wear and/or to maintain hard and sharp cutting edges. Eutectic Welding Alloys Corp., 40 Worth St., New York 13.

Eutecrod: Welding rods used with special fluxes utilizing the principle of surface alloying at low heats. Eutectic Welding Alloys Corp., 40 Worth St., New York 13.

Eutectic: Welding rods and fluxes, which bond to parent metal below the melting point of the latter. Eutectic Welding Alloys Corp., 40 Worth St., New York 13.

Eutectofilm: Coating used on Eutectic low-temperature welding rods to assist in surface alloying at low heat. Eutectic Welding Alloys Corp., 40 Worth St., New York 13.

Eutector: Fluxes for the welding at low heats of aluminum alloys, cast iron, steels, copper alloys, nickel alloys, and magnesium alloys. Eutectic Welding Alloys Corp., 40 Worth St., New York 13.

Eutectrode: Special flux-coated electrodes used with the metallic arc process. Eutectic Welding Alloys Corp., 40 Worth St., New York 13.

Evansteel: Medium-carbon Ni-Cr bearing steel for gears, high pressure valves. Chicago Steel Foundry Co., 3227 W. 37th Place, Chicago.

Evansteel: Ni-Cr alloy steels for tractor shoes, bucket lips, dipper teeth. Chicago Steel Foundry Co., 3720 Kedzie St., Chicago.

Evansteel: High strength steel alloys. Steel Foundry Co., Kedzie Ave. & 37th St., Chicago 32.

Evenray: Infrared heating equipment for baking, drying, preheating and dehydrating. Fostoria Pressed Steel Corp., Fostoria, Ohio.

Everard: High-carbon steel for dies, tools. Everard Tap & Die Corp., 215 E. 144th St., New York.

Everbrite: 60-30 Cu-Ni alloy with Fe-Si-Cr; for valves and chemical plant service. American Manganese Bronze Co., Rhawn & Torresdale Ave., Philadelphia.

Everbrite: Highly corrosion-resistant Cu-Ni-Fe-Mn alloy for steam applications. Curtis Bay Copper & Iron Works, Baltimore.

Everbrite: Copper alloy with 30 Ni, 6 Fe, Mn-Si, for valve disks, steam turbines, nozzle blocks and valves. Colmonoy Inc., Los Nietos, Calif.

Everlasting Fastenings: Bolts, screws, nuts, rivets and washers in brass, naval bronze, silicon bronze, Monel metal and stainless steel. H. M. Harper Co., 2620 Fletcher St., Chicago 18.

Everlock: Washers, terminals and nuts. Thompson-Bremer & Co., 1640 W. Hubbard St., Chicago 22.

Evershyne: Stainless steel. Samuel Osborn & Co., Ltd., Sheffield, England.

Ewart: Detachable Link-Belt chains. Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6.

Excelene: Grinding oils used for hard steels. D. A. Stuart Oil Co., 2727 S. Troy St. Chicago 23.

Excellay: Preformed wire rope. American Steel & Wire Co., Cleveland 13.

Excelsior: 53-45 Cu-Ni alloy for electric resistances. Alloy Metal Wire Co., Moore, Pa.

Excitron: Single anode mercury arc power rectifier. Allis-Chalmers Mfg. Co., Milwaukee 1.

Exogas: Heat-treating gas atmosphere. Westinghouse Electric Corp., East Pittsburgh.

Expansack: Shipping bag, multiple laminations of kraft, for dry colors, grains, other products. Cincinnati Industries Inc., Cincinnati (Lockland).

Explosimeters: Small easily portable combustible gas indicator. Mine Safety Appliances Co., Braddock, Thomas & Meade Sts., Pittsburgh.

Extra: Plain-carbon steel for machinery parts. Carpenter Steel Co., Reading, Pa.

Extra Strong: Solder for stainless steel. L. B. Allen Co., Inc., 6759 Bryn Mawr Ave., Chicago.

Eyeball Anvil: Anvil for use with the Rockwell hardness tester providing an adjustable surface for supporting tapered parts. Wilson Mechanical Instrument Co., Inc., 383 Concord Ave., New York 54.

E-Z: Chain connecting links. National Malleable & Steel Castings Co., Cleveland 6.

E-Z-Cut: High-sulfur, high-manganese free-machining steel plates. Joseph T. Ryerson & Son, Inc., Box 8002-A, Chicago 80.

Ezemount: Cover for tire valve caps. A. Schrader's Son Div., Scovill Mfg. Co. Inc., 470 Vanderbilt Ave., Brooklyn 17.

EZ Pull: Double-headed nails for containers. American Steel & Wire Co., Cleveland 13.

E-Z Stainless Steel: Cr stainless for cutlery tableware. Latrobe Electric Steel Co., Latrobe, Pa.

F

F & E: Sand mixers; underfed stokers. Flynn & Emrich Co., Holliday and Saratoga Sts., Baltimore.

Fabco: Shaft couplings. F.A.B. Mfg. Co., Inc., 1251—67th St., Oakland 8.

Faceamol: Shake-on foundry mold facing compounds. Whitehead Brothers Co., 543 W. 27th St., New York.

Faceweld: Arcwelding electrodes for building up surfaces to resist severe abrasion and shock. Lincoln Electric Co., 12818 Coit Rd., Cleveland 1.

Fafnir: Ball and roller bearings; radial, thrust and radial-thrust. Fafnir Bearing Co., New Britain, Conn.

Fahralloy: Series of Cr-Ni alloys for electric

furnace grids, high strength castings, acid pumps and carburizing boxes. American Manganese Steel Co., 375 E. 14th St., Chicago Heights, Ill.

Fahrite: High-chromium nickel stainless steels for oil industry service and furnace parts. Ohio Steel Foundry Co., Lima, Ohio.

Falls: Series of Mn and Al bronze deoxidizers; also nickel deoxidizers. Niagara Falls Smelting & Refining Corp., Jarvis & Elmwood Aves., Buffalo, N. Y.

Falls Brand: Copper shot for addition to cast iron. Niagara Falls Smelting & Refining Corp., Buffalo 17, N. Y.

Fanweld: Tungsten, chromium cobalt-base hardfacing rod. Available for oxy-acetylene and electric arc applications. Fansteel Metallurgical Corp., North Chicago, Ill.

Far-Best: Cutting oils, heat-treating compounds, rust preventives, industrial soaps and metal cleaners. Farrar Industrial Products Co., 6715 McKinley Ave., Los Angeles 1.

Farber: High heat duty fireclay brick. North American Refractories Co., 1012 National City Bank Bldg., Cleveland 14.

Farmface: Wear resisting iron alloy welding rod for hardfacing. American Manganese Steel Co., Chicago Heights, Ill.

Farrel: Rolling mill; heavy-duty roll grinders, cylindrical grinding machines, indicating calipers, Hi-Hard rolls, gear drives, speed-reducing and speed-increasing units. Farrel-Birmingham Co., Inc., Ansonia, Conn.

Farval: High-pressure centralized systems of lubrication, to deliver oil or grease to a large number of bearings from one central station in exact measured amounts. Farval Corp., 3249 E. 80th St., Cleveland 4.

Fasaloy: Silver-copper-cobalt alloy for electrical contacts. Fansteel Metallurgical Corp., Inc., 2200 Sheridan St., North Chicago, Ill.

Fasaloy No. 106: Silver-copper alloy having high electrical conductivity with spring temper. Fansteel Metallurgical Corp., 2201 Sheridan, N. Chicago.

Fasco: Full line of fractional horsepower ac and dc motors; also small blowers. F. A. Smith Mfg. Co., Inc., Rochester 2, N. Y.

Fascut: Treated tampico brushing wheels, especially adapted to blending surfaces, tool marks, removing light scale and burrs, forming radii, etc. Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14.

Fastell Alloys: Series of Ag-Pd, Pd-Ag-Ni, Ag-Cu, Ag-Cu-Ni, Ag-Cd alloys for electrical contacts. Fansteel Metallurgical Corp., Inc., 2200 Sheridan St., North Chicago, Ill.

Fas-Tin-Flux: Concentrated liquid tinning flux of zinc chloride type; used in hot-tinning, making terneplate and for soldering. Hanson-Van Winkle-Munning Co., Matawan, N. J.

Fastraverse: Metal-forming presses. Hydraulic Press Mfg. Co., Mount Gilead, Ohio.

Fay: Automatic lathes. Jones & Lamson Machine Co., Springfield, Vt.

Faultless: Brand Conveyor belts. Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6.

Faultless Babbitt Metal: Tin-antimony-lead babbitt for bearings. Hoyt Metal Co. of Great Britain, Ltd., London, England.

FCC Composite Tool Blanks: High-speed steel cutting surface welded to mild steel base. Forging & Casting Div., Allegheny-Ludlum Steel Corp., Ferndale, Mich.

Featherweight: Unit heaters. L. J. Wing Mfg. Co., 55 Seventh Ave., New York.

Federal: Open-back inclinable punch presses, dial feeds, and bow trimming machines. Federal Press Co., Elkhart, Ind.

Federal: Precision measuring gages. Federal Products Corp., 1146 Eddy St., Providence.

Federal-Mogul: Babbitt for bearings, and steel and bronze back bearings. Federal Mogul Corp., 11031 Shoemaker St., Detroit.

• In order to assure the accuracy and completeness of this directory, manufacturers and suppliers serving the metalworking industry are requested to check the trade names appearing in this and succeeding issues and to advise THE IRON AGE of any omissions or errors. These changes will be incorporated in the first reprint made for general distribution. Communications should be addressed to THE IRON AGE, 100 E. 42nd St., New York 17. Attention Trade Name Directory.

Federated "G" Babbitt: 0.75 Sn, 3 As, 12.5 Sb, bal. lead; lead-base babbitt; for precision bearings. Federated Metals Div., American Smelting & Refining Co., 21 Nassau St., New York.

Federated "S" Babbitt: 1.0 Sn, 1.10 As, 15 Sb, 0.5 Cu, bal. lead; lead-base babbitt. Federated Metals Div., American Smelting & Refining Co., 21 Nassau St., New York.

Federated "ST" Solders: 6-30 Sn, 1.75 Ag, 0.5-5 Bi, 0.5 Sb, bal. lead; free-flowing low-tin solders. Federated Metals Div., American Smelting & Refining Co., 21 Nassau St., New York 5.

Fellows: Gear cutting, finishing, measuring and testing machines and equipment. Fellows Gear Shaper Co., Springfield, Vt.

Fend: Barrier protection for workers' skin. Mine Safety Appliances Co., Braddock, Thomas & Meade Sts., Pittsburgh.

Fenox: Plastic electric sealing and boiler-casing sealing compound. Bakelite Corp., 300 Madison Ave., New York 17.

Feralite: Special malleable cast iron. Chapman Valve Co., Essex St., Indian Orchard, Mass.

Feralsi: Fe-Al-Si alloy for magnetic applications. Unexcelled Mfg. Co., 11 Park Place, New York.

Feralun: Wear-resistant iron base with abrasive grains embedded, for stairs and platforms. American Abrasive Metals Co., Irvington, N. J.

Feran: Fe-Al bimetals used in canning industry. Hoesch-Kohn-Nevessen, Dortmund, Germany.

Fernichrome: 37 Fe, 30 Ni, 25 Co, 8 Cr alloy for glass-to-metal parts. General Electric Co., Schenectady.

Fernite: Series of heat and corrosion resistant iron alloys with up to 65 Ni or 28 Cr, for cast heat-resistant parts in heavy-duty applications. Forging & Casting Corp., Ferndale, Mich.

Ferracute: Power presses and press brakes. Ferracute Machine Co., Bridgeton, N. J.

Ferrisul: Anhydrous ferric sulfate. Mild oxidizing agent for pickling alloys such as stainless steels, brass and other copper alloys. Monsanto Chemical Co., Everett Station, Boston 49.

Fermo Special: Plain-carbon steel for case-hardened parts. Industrial Steels, Ltd., Sheffield, England.

Ferro: Flux for welding cast iron and steel castings. Linde Air Products Co., 30 E. 42nd St., New York 17.

Ferro-Boron: Ferroalloy containing B, Si and other elements. Electro-Metallurgical Co., 30 E. 42nd St., New York; and Molybdenum Corp. of America, Grant Bldg., Pittsburgh.

Ferrocal: Cast aluminum alloy for permanent molds, general machinery parts. Aluminiumwerke Maulbronn, Maulbronn, Germany.

Ferrocarbo: Supplied in briquetted form for deoxidizing and inoculating cast iron in the cupola. In granular form for ladle treatment of steel to provide deoxidation, stringer reduction and inclusion dispersion. Carborundum Co., Refractories Div., Perth Amboy, N. J.

Ferrocite: Powder metals for valve guides. Charles Hardy & Co., 420 Lexington Ave., New York.

Ferrodur Iron: Iron for centrifugal castings, pump liners, shaft sleeves. Janney Cylinder Co., 8037 Frankford Ave., Philadelphia.

Ferrolite: Grinding wheels for cast iron, brass, aluminum, bronze and other materials of low tensile strength. E. C. Atkins & Co., 402 S. Illinois St., Indianapolis 9.

Ferrous Fluoborate: A high-speed acid copper electroplating solution. General Chemical Co., 40 Rector St., New York 6.

Ferrotherm: Series of heat and corrosion-resistant steels and cast irons for furnace parts, crucibles, autoclaves, recuperators. Fried. Krupp, A.G., Essen, Germany.

Ferroweld: Arcwelding electrode to repair cast iron which does not need to be machined. Lincoln Electric Co., 12818 Coit Rd., Cleveland 1.

Ferry: 55-45 Cu-Ni alloy for electric resistances, thermocouples. Henry Wiggin & Co., Ltd., Birmingham, England.

Fibreen: Reinforced waterproof paper for wrapping and packaging sheet steel. Sisalkraft Co., 205 W. Wacker Drive, Chicago 6.

Fibron: Elastic, heat-sealing plastic tape for wrapping wiring subjected to severe operating conditions. Irvington Varnish & Insulator Co., Irvington 11, N. J.

Fi-Carbo: See Finkl.

Fifty-Five: Cast iron with Ni, Mo, Si for hydraulic press and diesel engine parts. Lake Erie Engineering Corp., 502 Woodward Ave., Buffalo.

File Finish: Process of casting high-grade iron to close tolerances, eliminating a large portion or all tooling on dies, etc. Advance Foundry Co., 107 Seminary Ave., Dayton 3.

Fillex: Arcwelding electrode for steel; corresponds to AWS E-6020. Metal & Thermit Corp., 120 Broadway, New York 5.

Filmatic: Hydraulic precision grinding machine. Cincinnati Grinders, Inc., Cincinnati 9.

Filmeter: Electronic instrument for measuring thickness of paint, varnish, lacquer, plastic, etc. American Instrument Co., Silver Springs, Md.

Filmonize: A series of self-sealing riveting, identifying, splicing, packaging, mending and masking tapes. International Plastic Corp., 10 Park Pl., Morristown, N. J.

Filnic: Ni-Co-Ti-Fe alloy for resistance metal filaments. Driver-Harris Co., Harrison, N. J.

Filterweld Plates: Chemically compounded welding glass to give maximum protection against ultra-violet and infra-red radiations. Available in six shades. American Optical Co., Southbridge, Mass.

Fin Fan: Cooling units. Fluor Corp., Ltd., 2510 S. Atlantic Blvd., Los Angeles 22.

Firearmor: Heat and abrasion-resistant Ni-Cr-Fe cast alloy for carburizing boxes. Michiana Products Corp., Michigan City, Ind.

Fireblock: 9 x 24 in. firebrick for industrial furnaces, flues, stocks, etc. Johns-Manville Co., 22 E. 40 St., New York 16.

Firefite: Fire-resistant insulated wire. American Steel & Wire Co., Cleveland 13.

Firefrax: Refractory cements made from kaolin or fireclay-base materials for higher temperature applications. Carborundum Co., Refractories Div., Perth Amboy, N. J.

Firinit: Welding and soldering rods. Metallo-Chemische Fabrik, Dr. Leopold Rostosky, Berlin, Germany.

Firth Brown: Series of plain carbon steels for forgings, boiler drums, piston rods, shafts, die blocks, gears. Thos. Firth & John Brown Ltd., Sheffield, England.

Firth-Vickers: Austenitic 18-8 stainless for chemical apparatus to resist acids at elevated temperatures. Thos. Firth & John Brown, Ltd., Sheffield, England.

Fisco: Low Mn-Cr-Mo alloy steel for shafts and gears. Faitoute Iron & Steel Co., Newark, N. J.

Fisher: All types of foundry, core oven and diecasting furnaces. Fisher Furnace Co., 5535 N. Wolcott Ave., Chicago 40.

Five Point Deep Hard: Alloy steel for gears, axles, wrist pins, wheels, valves. Foote Bros. Gear & Machine Corp., 5225 S. Western Ave., Chicago.

Fixinvar: Iron-bearing 36 Ni for clocks and other applications where low-thermal expansion is important. Soc. Anon. de Commentry Fourchambault et Decazeville, Paris, France; R. Y. Ferner Co., Investment Bldg., Washington.

Flamaloy: Wear resistant iron alloy for castings. Detroit Alloy Steel Co., Wight, Martin & Klunder Sts., Detroit.

Flame-otrols: Combustion safeguards which act to shut fuel valves upon flame failure; for use on furnaces, ovens, boilers, kilns, heaters, etc. Wheelco Instruments Co., Chicago 7.

Flame Weld: Rail bonds. American Steel & Wire Co., Cleveland 13.

Flash-Ex: Water-soluble compound for protecting dies, holder jaws and metal parts from bonding of welding flash and spatter in resistance welding. Wayne Chemical Products Co., Detroit 17.

Flash-O-Lens: Portable 40X microscope for examining metal products. E. W. Pike & Co., Elizabeth 3, N. J.

Flat-Roll: Belt conveyor idlers. Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6.

Flat-Top: Belt conveyor idlers. Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6.

Flatweave: Improved construction of flexible flat woven wire rope sling. John A. Roebling's Sons Co., Trenton 2, N. J.

Fleco: Universal flexible coupling that protects precision bearings. Brownstein Mfg., Ellwood City, Pa.

Flecto: Specially annealed malleable cast iron for castings to be hot galvanized. Ohio Brass Co., 102 Surrey Road, Mansfield, Ohio.

Flectrol: Electrical remote-positioning control for every type of motor-driven adjusting or control mechanisms, such as speed changers, machine tool controls, motorized valves, presses, etc. Yardeny Laboratories, Inc., 105 Chambers St., New York 7.

Fleet-Arc: Arc-welding machines, ac transformer types. Lincoln Electric Co., 12818 Coit Rd., Cleveland 1.

Fleetweld: Arc-welding electrodes of various types, primarily for welding mild steel. Lincoln Electric Co., 12818 Coit Rd., Cleveland 1.

Flexalyn: Glycol esters of rosin for lacquers, casein paints, etc. Hercules Powder Co., Wilmington, Del.

Flexarc: Series of arcwelding electrodes for steel; welding machines. Westinghouse Electric Corp., East Pittsburgh.

Flexeal: Corrugated metal gasket enclosed by a layer of woven asbestos metallic cloth for boiler manhole and handhole plates. Goetze Gasket & Packing Co., Inc., New Brunswick, N. J.

Flexi-Bilt: Steel bin units with adjustable shelves and slotted for patented boltless dividers which permit changeable widths of compartments. Berger Mfg. Div., Republic Steel Corp., Canton 5, Ohio.

Flexible Power: Power presses. General Mfg. Co., Detroit 11.

Fleximatic: High-production drilling and tapping machine using standard automatic units for multiple operations. Kingsbury Machine Tool Corp., Keene, N. H.

Flexipipe: Woven fabric flexible tubing used for mine, tunnel and industrial ventilation. Bemis Bro. Bag Co., 408 Pine St., St. Louis 2.

Flexlined Bag: Burlap or cotton, lined with waterproofed kraft for chemicals, fireclay, ore concentrates, etc. Cincinnati Industries, Inc., Cincinnati (Lockland).

Flexo: 2.0 Si spring steel. Carpenter Steel Co., Front & Bern Streets, Reading, Pa.

Flexo: Railway journal box lids. National Malleable & Steel Castings Co., Cleveland 6.

Flex-O-Matic: Quick air couplers and nipples. Lincoln Engineering Co., 5701 Natural Bridge Ave., St. Louis.

Flex-O-Timer: Welding time-cycle controllers. Taylor Instrument Co., Rochester 1, N. Y.

Flexo Wax C: Emulsion in combination with paraffin wax producing water-repellent coating for aluminum, zinc and tin liable to attack by water condensation. Glyco Products Co., Inc., 231 King St., Brooklyn.

Flexset: Preformed wire rope. Broderick & Bascom Rope Co., 4203 N. Union Blvd., St. Louis 15.

Flint Arrow: High heat duty fireclay brick. North American Refractories Co., 1012 National City Bank Bldg., Cleveland 14.

Flint Shot: Washed-dried and screened silica sand, rounded in characteristics, and specially screened to certain size and used for sandblasting. Ottawa Silica Co., Ottawa, Ill.

Flint Silica: Washed-dried and screened white silica sand for cores and molds. Ottawa Silica Co., Ottawa, Ill.

Flintex: Fire brick. Robinson Clay Products Co., Akron 9, Ohio.

Flint-Rim: Sprocket wheels. Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6.

Flint Shot: Mineral abrasives for blast cleaning. Ottawa Silica Co., Ottawa, Ill.

Flintcast: Electric furnace iron. Pacific Foundry Co., Treat at 19th St., San Francisco, Calif.

Flintuff: Hard alloy for rolls. Ohio Steel Foundry Co., Springfield, Ohio.

Floatex: Foundry shakeouts. Robins Conveyors, Inc., 270 Passaic Ave., Passaic, N. J.

Flock: Finish for any surface to give appearance of felt, velour, mohair, suede, velvet, carpet, etc. Rayon Processing Co., 65 Tremont St., Central Falls, R. I.

Flo-Gage: Midget differential meter to register flow of water, steam or air. Builders-Providence, Inc., 9 Codding St., Providence, R. I.

Flo-Klean: See Micro-Klean.

Floor-Veyor: Permanent installation type power belt conveyor (floor to floor). Rapids-Standard Co., Inc., Bond and Trowbridge Sts., Grand Rapids 2.

Florite Dessicant: Granular drying agent for gases and liquids; for producing bone-dry fuel and heat-treating gases such as natural gas, carbon dioxide, propane, nitrogen, etc. Floridin Co., Inc., 222 Liberty St., Warren, Pa.

Flosol: Soldering and brazing fluxes that wet oily surfaces; for use on steel, brass, copper, tin, terne plate, zinc and galvanized iron; liquid, paste or cream. American Chemical Paint Co., Ambler, Pa.

Flotectic: Flux for low-temperature welding. Eutectic Welding Alloys Corp., 40 Worth St., New York 13.

Flo-Watch: Instrument for metering and controlling flow, pressure, etc. of liquids. Builders-Providence, Inc., 9 Codding St., Providence, R. I.

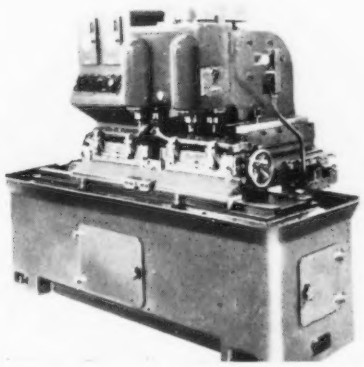
Flowrator: Variable-area type flow metering instruments. Fischer & Porter Co., Hatboro, Pa.

(CONTINUED ON PAGE 140)

Machine Tools

Recent developments in general purpose, high speed and multioperation milling machines, special drilling machines, gear cutters, grinders, boring machines, lathes, broach sharpeners and spin riveters are described in the following pages of this New Equipment section.

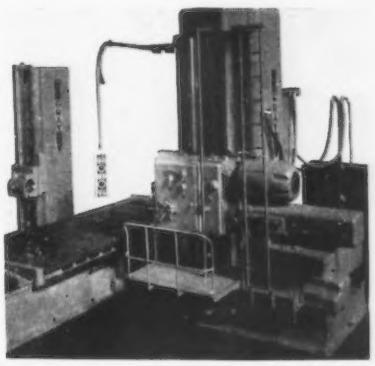
❶ A special purpose two-stage machine for milling the bosses or cylinder head castings has been completed by *Hydraulic Machinery, Inc.*, 12825 Ford Rd., Dearborn, Mich. The machine is hydraulically operated and electrically con-



trolled. While the operator unloads and loads a part in the station away from the work position, the milling head moves in, machining the part in the work station. As the milling head retracts, the part just loaded by the operator moves into position and the cycle of operation is repeated. Production is rated at 90 per hr.

Horizontal Mill

❷ Featuring electronic drive for all feeds, nonmetallic way for the table and column base and automatic power clamping of table, column, headstock and end support, a horizontal boring, drilling and milling machine of the planer type has been introduced by the *G. A. Gray Co.*, Cincinnati. The machine also features push button controls for the head, column, spindle, and table, all centralized on the pendant switch which can be placed in any convenient position. The use of separate motors for feeding the table and headstock permits independent feeds and makes it possible, it is said, to follow an irregular line with the cutter by push button control. The Gray Woodpecker positioning device sets the various units within 0.00025 in. by pressing a micro-jog button on the pendant switch. The table is driven by the Gray stub shaft spiral geared drive. Twenty-four speeds in geometric progression for the single heavy duty spindle are provided, with normal speed range for the 5 and 6-in. bar from 4½ to 900 rpm; for the 7 and 8-in. bar from 2½ to 500 rpm.



Safety devices and interlocks are provided to protect the machine and the work. Feed motors cannot be operated except for jogging and rapid traverse unless the spindle motor is running.

TIME-SAVER CARD for your convenience in obtaining, without obligation, more information on any one or more of the new equipment items featured on this and following pages.

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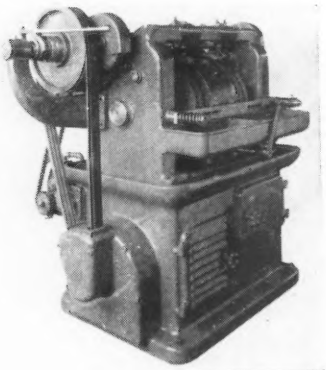
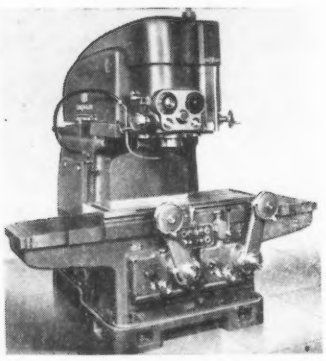
High Speed Mill

❸ A drum-type milling machine permitting single or double milling of four pieces at once has been developed by *Sommer & Adams Co.*, Cleveland, for production of studs, nuts, bolts, pins, strips, etc. The machine's high production rate in straddle milling, slotting or facing is said to be due to multiple milling cutter mountings. Other features are a quick-loading chuck, automatic ejection of finished work and easy access to cutters for adjustment or regrinding. The drum rotating gearbox is mounted in the center of the frame, with pick-off gears for changing the speed of the rotation of the drum. The spindle drive V belt pulley has a disk type clutch for disengaging rotation of the cutter spindles and drum.



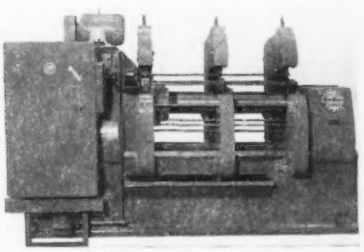
Vertical Milling Machine

❹ Said to be versatile as a general purpose milling machine, the 16-in. series vertical Hydro-Tel, built by the *Cincinnati Milling Machine Co.*, Cincinnati 9, can be provided with automatic control mechanisms which make it a die-sinking and profiling machine. The basic machine consists of a fixed height bed cast integral with the rear base, on top of which is mounted the table. The machine is built in three styles: a general purpose milling machine which is the basic machine provided with hand and power feeds to the table and cross-slide, the hand feed being only for vertical positioning of the spindle carrier. Besides general purpose work, this machine is for hand-controlled, die-sinking operations. The die-sinking machine with automatic depth control is the basic machine plus an automatic hydraulic tracer mechanism which provides automatic duplication of templates or master shapes. This machine is used for general purpose work or for automatic, tracer controlled die-sinking. A variation of the machine, for tracer controlled profiling, is equipped with an automatic, hydraulic 360° profiling mechanism. Hand and power feed movements of the sliding elements of the milling machine are hydraulically actuated. Handwheels can be operated by finger-tip pressure regardless of size of work or heavy cutting loads, it is said. Power feed rates which range from 1 to 25 ipm are nonrelated; they are independently controlled and selected and may be used simultaneously at differing rates. Sixteen spindle speeds are supplied, the standard range being 25 to 1500 rpm with an optional range of 33 to 2000 rpm. All operating controls are located at the front of the machine.



Milling and Spinning Machine

❺ Added to the line of special purpose machine tools built by the *Davis & Thompson Co.*, Milwaukee 14, is one of the index type for milling and spinning shafts. The machine illustrated has eight stations for rough and finish milling one end of steering shafts and deburring and spinning a rivet head on the ends of these shafts for holding the steering worm. Design of this machine incorporates chain clamping of the indirect type which permits the operator to load and unload pieces as the stations pass. This method of



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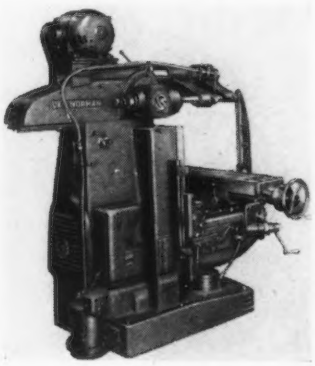
clamping is said to insure positive clamping which is readily adjustable for any desired tension. After the machine has been fully loaded, each indexing of the fixture delivers a finished piece to the loading station ready for removal and replacement with a rough piece. Heads of the machine are fed hydraulically while all other functions are performed electrically. Production of the machine is rated at 300 pieces per hr.

Ram Type Milling Machine

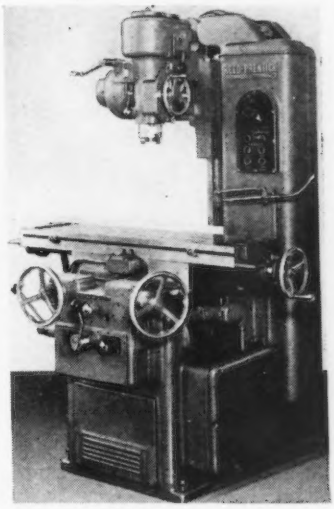
6 Designed for use in pattern shops, tool rooms, tool and die shops, laboratories, and machine shops, the No. 22M ram type milling machine has been announced by the *Van Norman Co.*, Springfield 7, Mass. One of its advantages is the higher column which provides greater vertical range between the cutterhead and the lowest position of the table. The machine is designed to bring



the table, which is 50 x 10 in., nearly up to the center line of the spindle. An adjustable cutterhead mounted on a movable ram enables the operator to perform any type of conventional milling from horizontal to vertical or angular, permitting fluctuating milling requirements. The spindle can be furnished with No. 13 B&S taper or No. 40 National Standard taper. Front and rear directional controls of all power feeds are provided with provision for locking any feed in neutral. Longitudinal table range is 28 in., cross 10 in. and vertical 20 in. with nine speeds available from 40 to 1100 rpm.

Vertical Milling Machine

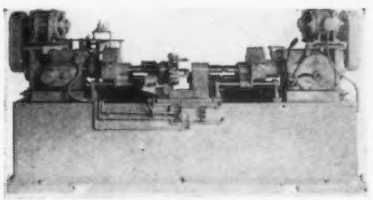
7 Electronic control and universal head are outstanding features of a vertical milling machine developed by the *Reed-Prentice Corp.*, Worcester 4, for the making of plastic and rubber molds, die-casting dies, forge dies, jigs and fixtures. This 12V universal head milling and die sinking machine in-



cludes, also, a centralized control panel, infinitely variable feeds and spindle speeds, making it suitable for die sinking, duplicating, boring, drilling and face or straddle milling. The quill type milling and boring head is mounted on an adjustable ram and all gearing is centrally located at front of the machine. The head can be adjusted for all angles up to 45° front to back and 30° left to right. Speed and feed controls are push button type, with two levers controlling directional feed and rapid traverse of table, front and back or right and left. Infinitely variable spindle speeds are from 90 to 2200 rpm, with feed rate from ⅛ to 16 ipm.

Boring Machine

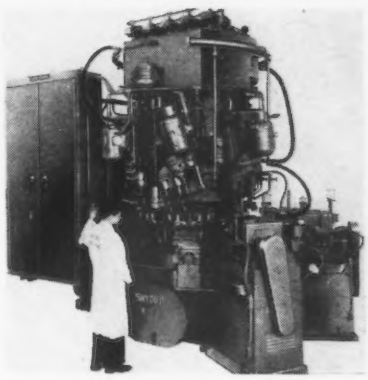
8 For rough and finish boring, counterboring, finish facing and chamfering three bearing holes in a gear case, and mating gear



cover, a double end precision boring machine has been built by *W. K. Millholland Machinery Co.*, 1048 Fairfield Ave., Indianapolis 5. The work is clamped in an air-operated fixture and the cycle is initiated by depressing a push button which starts the automatic cycle for the roughing operation. As the roughing head returns to its starting position it actuates a limit switch which in turn starts the cycle for the automatic finishing operation. For the rough boring operation, the feed starts with a coarse feed and automatically changes to fine feed for counterboring and with a dwell for finishing up the facing. For the finishing operation, the feed is automatically changed from the finish boring to a fine feed for finish facing and with a dwell to finish face the bosses to close limits. The profile of the cams on the units determine the rate of feed. The tool holders carry multiple cutters which allow for fast feeds on the boring operation. The gear cover is run over the same machine after changing tools and work holding fixtures.

Multi-Operation Automatic

9 Auto connecting rods are milled, sawed, drilled, reamed, tapped, countersunk, counterbored and burred in a special automatic machine designed and built by *Snyder Tool & Engineering Co.*, 3400 E. Lafayette, Detroit 7.

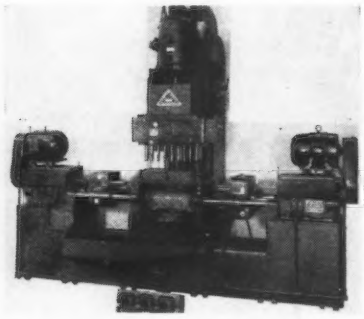


The drop-forged steel conn rods are machined complete except for bearing cap joint faces and crank and wrist-pin holes. The machine is of center column construction, with dual workholding fixtures mounted on a 12-station power driven Geneva index table. Rods are clamped and unclamped two at a time by a power-driven wrench. Production at 80 pct of rated efficiency is 266 rods per hr. Standard and special machining units have individual motors and drive through a change-gear box and V

belts. They are hydraulically fed except the tapping head, which is traversed to and from operating position hydraulically, then lead-screw fed for work stroke. High speed steel tools operating at 60 fpm are employed, and tapping is performed at 30 or 40 fpm.

Three-Way Drill

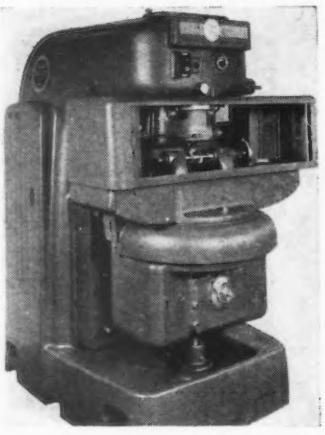
⑩ To drill the bottom and both ends of an automobile motor block, a three-way machine has been manufactured by the *LeMaire Tool & Mfg. Co.*, 2657 S. Telegraph Rd., Dearborn, Mich. This machine consists of a one-piece base on which LeMaire No. 5000 twin ram units with multiple spindle heads are mounted at each end and a No. 20 drilling machine less table and base is mounted at the rear. A bridge type fixture incorporating all drill bushings is provided. The machine drills 14 holes in the right end of the block; drills 37 holes, drills and counterbores 1 hole in



the top; drills 5 holes, counterbores 1 hole and core drills and counterbores 1 hole on the left end of the block. The machine is rated at 50 pieces per hr. Helical gears are used in all drill heads and standard hydraulic drill units. Push buttons control cycle start, stop, start and emergency return.

Diagonal Gear Shaver

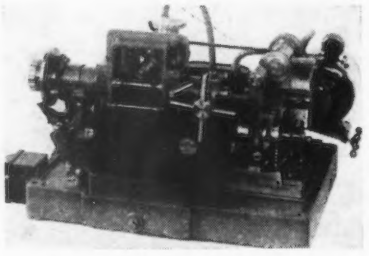
⑪ Incorporating a mechanical principle of diagonally feeding the work gear across the cutter, a diagonal gear shaving machine has been announced by the *National Broach & Machine Co.*, 5598 Jean St., Detroit. In this shaving machine, the work is fed at an angle to its axis, the angle being selected with reference to the dimensional and physical characteristics of the gear being shaved. The angle is also selected to obtain optimum conditions for both cutting speed and surface finish. This diagonal traverse is said to facilitate the shearing action at each cutting edge, thus making it practicable to remove more stock per cycle and in less cutting time. The entire cut-



ting cycle is composed of two passes through the cutter. Another advantage of diagonal traverse is said to be that the full face of the cutter, the width of which is not restricted, is effective during each cutting cycle. Conventional cutters are adequate and cutter serrations need not be staggered. The center distance between cutter and work gear remains constant throughout the complete run of any size of work gear.

Gear Cutter

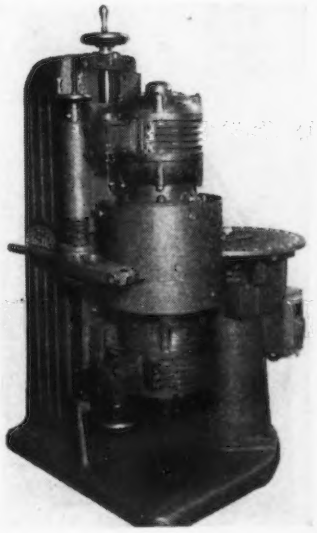
⑫ A pinion and gear cutting machine with capacity up to 2¼-in. pitch diam with 2 in. length of cut has been announced by the *Waltham Machine Works*, Waltham, Mass. The machine, for bench operation or provided with a pedestal, is a single cutter machine, with the revolving cutter making successive



cuts on blanks held and indexed by the work spindle and supported by tail center. Only straight teeth can be cut. Automatic from start to completion of the last cut, the machine stops with cutter lifted clear of work, thus permitting quick loading and unloading. The motor is connected to a shaft that drives the cutter spindle, coolant pump, and indexing mechanism by two endless V belts. The standard work slide cam allows an adjustment of strokes between 1.4 and 2.4 in. A 120 division index is furnished with the machine, and cutters are 1 in. diam with ⅜-in. hole. Arbors for other dimensioned cutters can be supplied.

Vertical Spindle Grinder

⑬ Listed as No. 902 and designed to speed the grinding of steel rollers, carbon brushes, washers, ceramic parts and a variety of other small pieces within allowable tolerances, a double vertical spindle grinder has been introduced by *Charles H. Besly & Co.*, 118-124 N. Clinton St., Chicago 6. This direct drive grinder features a horizontal rotary feed enabling the operator

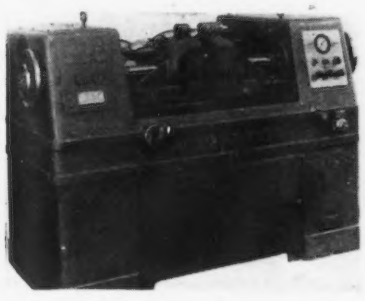


to drop the small parts into the feed wheel rapidly and accurately, and has 1 hp, 1800 rpm direct drive motors, bolted on abrasive disks, 12-in. diam x 4-in. hole. The machine is rated at from 3000 to 4000 small coil springs per hr.

Precision Thread Roller

⑭ Model C precision thread roller has been announced by the *Watson Flagg Machine Co.*, Paterson, N. J., which automatically and consistently, it is said, produces class 4 threads as long as the blanks are held to size. It is not necessary to do more than spot checking, as the thread accuracy is in the die rolls, which maintain their accuracy for life. The cycle of operation is automatic, either a single complete cycle or continuously repeated cycles, which are

push button controlled from the control panel. The machine has three operating speeds; will thread diameters up to 2½ in. regularly, and 4-in. diam with special arrangements. Length of thread is



2¼ in.; with special arrangements, 2¾ in. Flow control and time delay permit threading very light pieces or softer metals such as die-castings.

Face and Knife Grinder

⓯ Incorporating electronic drive with finger tip control, type NT-20 face and knife grinder featuring adjustable speed has been announced by *Samuel C. Rogers & Co.*, 191 Dutton Ave., Buffalo 11. Speed changes within the range of 5 to 70 fpm are permitted through the dial on the front of the machine while the machine is running. The electronic drive allows the selection of the right speed for each kind of work, slow traverse for

heavy cuts or fast traverse for light cuts with high finish. The table traverse is started by pushing the starting button operating a dc motor, the speed adjusting dial being preset for any speed within the specified range. Reversing, quick stopping and complete control are automatically provided for in both forward and reverse operations. An ordinary ac source of power drives the 10-hp motor, and connection to dc current is automatically made through the electronic panel. The table is 72 in. long x 16 in. wide.

Grinding is done by a 20-in. cylindrical grinding wheel. The grinder, designed for production on iron and steel parts, is adjustable for grinding long or narrow recessed areas or wide solid sections up to 12 in. wide.

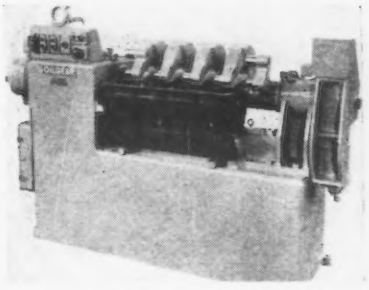
Wet Grinders

⓰ A line of redesigned wet grinders has been announced by the *Hisey-Wolf Machine Co.*, Cincinnati 25, made in sizes for 10, 12, 14, 18, 20, 24 and 30-in. grinding wheels. The grinders are of the double end model, illustrated, or can be supplied with one grinding wheel only. A combination wet and dry model with one wheel for dry operation and the other for wet

grinding is also available. The new designs incorporate improved bearing seals, motor mounting, settling chamber, etc. The motor is mounted on the rear of the pedestal with V-belt drive to the spindle. The pump is of the self-priming type with individual control valve for each wheel.

Bushing Assembling Press

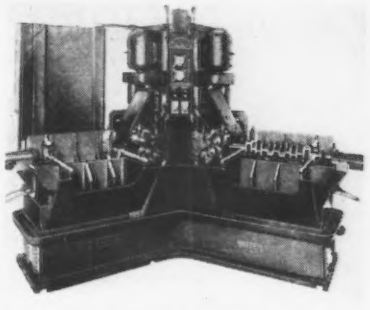
⓱ Five different sizes of cam shaft bushings are assembled in eight-cylinder motor blocks in one operation on a cam shaft bushing assembling press which has been designed by the *Oilgear Co.*, 1303A West Bruce St., Milwaukee 4. Conveyor height design, semi-automatic, interlocked, electric-hydraulic control, alternative manual push button control, variable pressing and return speed, and reduction of operator's work to slipping cam shaft bushings on pins and guiding the block to assembly position are the salient features of this press. The electric-hydraulic control is so interlocked that the bushing bar is not rotated into assembling position nor pulled inward to press home the bushings until the bushings have been placed on the pins and the motor block has been guided into approximate assembling position on the press. The cycle of operation is repeated automatically after the finished motor



block has been guided onto a conveyor and a new motor block placed into position. A direct reading gage indicates the pressure and force required to assemble bushings.

Keyway Cutter

⓲ Designed to cut, at each station, two keyways in a large crankshaft, a dual automatic keyway cutter has been built by *Snyder Tool & Engineering Co.*, 3400 E. Lafayette, Detroit 7. Work parts are clamped hydraulically, and loading and unloading is performed at one station while the other is in operation. Since single-purpose machine elements are em-

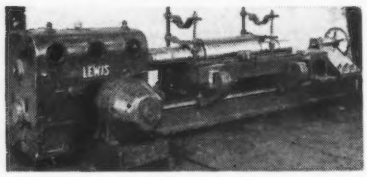


ployed, the machine is structurally and functionally simple and rugged, it is claimed, and operates at high production rates. Push button control activates the automatic cycle. Spindle slides are provided with rapid advance and return and hydraulic feeds are adjustable. Spindles are worm-gear driven and drive high-speed steel cutters with integral shank. Cutting speed is approximately 40 fpm.

Roll Lathe

⓳ Known as the heavy-duty roll lathe with enclosed face plate, a roll lathe of improved design has

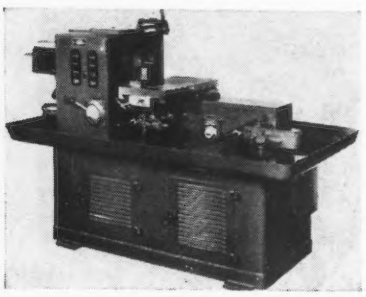
been developed by the *Lewis Foundry & Machine Div.* of *Blaw Knox Co.*, Pittsburgh. The unit is reported to be more rugged than previous models and provides greater



power at the face plate driver. The lathe also has 25 pct fewer parts and the face plate is partially enclosed within the headstock as a safety feature. Also new is the headstock, consisting of heavily ribbed construction of only two sections; internal marine lamps with glass ports to enable oil and gear inspection during lathe operation; flexible positioning of the motor; and confinement of the total overall width of the headstock within the dimensions of the bed plate. Other features include a drive of worm and helical gears, roller bearing equipment of the headstock, and a separate oil circulating pump to bearings and gear teeth. The lathe is adaptable for turning heavy forgings with automatic feeds and is built in every range of roll size from 64 in. down.

Semiautomatic Lathe

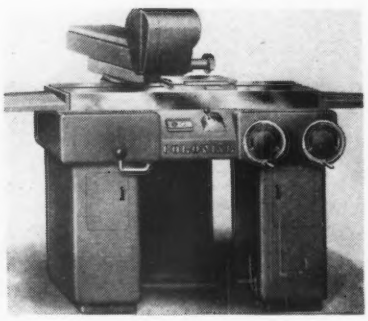
(20) No. 650 lathe, manufactured by the *Oster Mfg. Co.*, 2057 E. 61st St., Cleveland 3, is a single spindle machine equipped with a four-speed motor, hydraulic feeds and semiautomatic features with all controls, including a push button station, located conveniently to



the operator. The machine is furnished with either single action or double action cross slides, hydraulically operated with valves and other controls providing an automatic cycle of fast approach, feed, dwell, fast retraction and stop. The headstock casting contains the spindle, spindle bearings and oil reservoir. The four-speed motor has an operating rating of 7½ hp max, supplying direct drive for the spindle which is equipped with hydraulically operated push-out or draw-back collet. The machine weighing approximately 3000 lb is furnished complete with motors, controls and related equipment but without tools. Dimensions are 50 in. high x 44½ in. wide x 79 in. overall length.

Flat Broach Sharpener

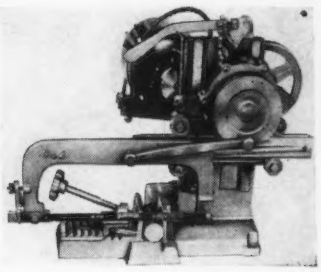
(21) Announcement of a broach sharpening machine which sharpens flat surface broaches even several feet long has been made by the *Colonial Broach Co.*, Box 37, Harper Station, Detroit 13. The machine has been designed to make



the job easier for the operator. Two pedestals form a deep knee-hole permitting the operator to sit close to the machine, and at the back a third pedestal supports the grinder head. Two hand-wheels for controlling lengthwise movement of the table and for raising and lowering the grinder head are located at the right side of the knee-hole. A lever within "lazy reach" of the operator controls the grinding wheel movement back and forth across the face of the broach teeth to sharpen them. To further ease the operation the cross-slide carrying the grinder head is of lightweight construction and is mounted on ball bearings at both top and bottom. Length of the table is 48 in., with a 36-in. table travel. The grinding wheel spindle can be operated at various speeds ranging from 4000 to 10,000 rpm.

Power Hack Saw

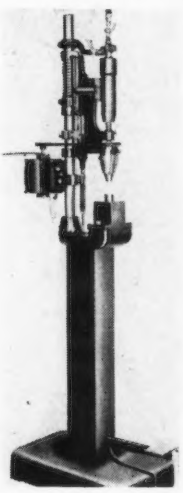
(22) Designed for use in the home workshop as well as the largest job shops and factories, a power hack saw, known as the Standard Hi-Speed power hack saw, has been announced by the *T & S Engineering Co.*, 15 N. Euclid Ave., Pasadena 1. Design features include lift on the return stroke accomplished by a lever mechanism; ball bearing guides for the saw frame; automatic cutoff switch and angular cutting. The No. 3 floor model



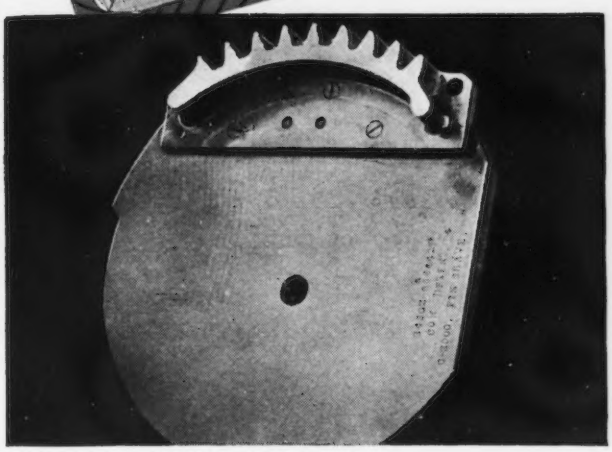
has a 6 x 6-in. capacity and 14-in. power blade; No. 2 bench model has a 4 x 4-in. capacity, 12-in. blade, and is a dry-cut saw.

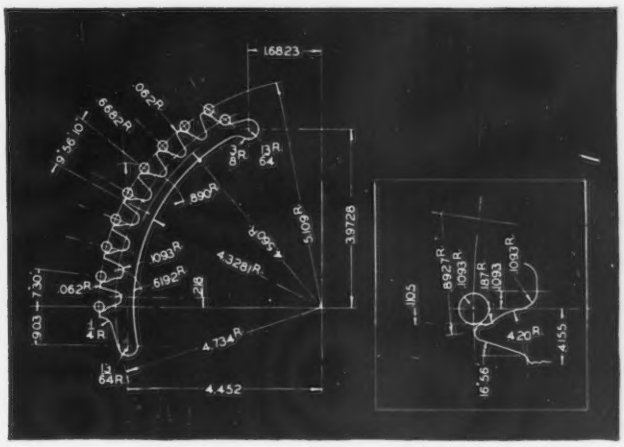
Spin Riveter

(23) Known as the Pneu-Spin riveter and featuring interchangeable capacity heads of 3/32, 5/32, ¼ and 5/16 in., based on solid, soft steel rivets, a spin riveting machine has been announced by the *Schlack Mfg. Co.*, 13255 Birwood Ave., Detroit 4. Heads are screwed and doweled to the frame, spring supported on vertical column and connected to a foot treadle for movement downward against a spring to contact the work. Operating on 75 to 80 lb air pressure, heads impart 4000 to 6000 short ¼-in. max blows per min to the rotating spindle and peening tool. Force and frequency of the blows can be controlled by adjusting the aircock on the valve. Peening tools attached to the taper on the spindle form round, oval and flat heads; peen shaft pins and studs; flare small tubes and brass connectors; furl shoulder bushings, bearing housings, and light tubes to sheet metal or plastics. A ⅛-hp, 1200 rpm motor with push button control is used for rotating the spindle. Throat depth of the riveter is 4¼ in., and frame travel is 2½ in.



How to Mill this Shave Punch Complete in 60 Hours





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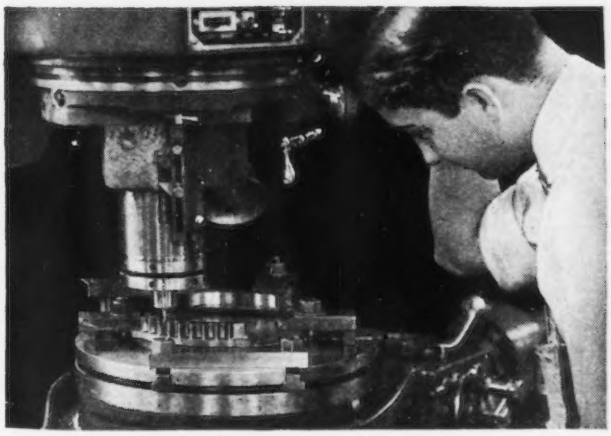

3 **ACCURATE!** Single setup held chance of error to minimum. Operator relied on built-in precision, control and measuring devices — had no difficulty holding tolerance to +.0005"−.0000".

Photos and information Courtesy of National Cash Register Co.

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Assembly Line . . .

WALTER G. PATTON

• Cadillac engineers test postwar cars at GM proving ground . . . All 1947 Cadillacs reported sold. Palmer-Bee hits back at portal suits.

DETROIT—When C. F. Kettering, General Motors research director, asks his favorite question—"What are you going to do when you can't keep on doing the things you are doing today"—at least one General Motors division — Cadillac — is going to have an answer for "The Boss."

This was disclosed at a meeting of Cadillac dealers in Detroit this week when energetic John F. Gordon, newly elected vice-president of General Motors and general manager of Cadillac revealed that his company has seven cars under test at GM proving ground to determine the true engineering facts about such things as weight distribution, high octane fuels, engine in the rear, automatic transmissions, dual tires, the place of plastics in the modern motor car, braking systems, spring suspension, lighting systems, vision—all the questions that arise in connection with the design, styling and building of the modern postwar car.

As Mr. Gordon explains it, Cadillac wants to know the answer to these engineering questions *before* making decisions which will put these ideas into the cars being built on the assembly line. Then, he said, Cadillac owners and dealers and all others connected with the company can be reasonably certain that the correct engineering decisions are being made.

Other Cadillac test projects include research work on aluminum, new types of metal finish, fabrics and other materials that might conceivably be used in the construction of a postwar automobile.

When General Motors decided to postpone its research project calling for the construction of $20 million technical center for research and engineering on Mound Road, Mr. Gordon was not satisfied to let the program lapse. Instead, he persuaded General Motors to let him bring 300 technicians over to Cadillac where they are now working in close cooperation with Cadillac executives and engineers on what Mr. Gordon believes will be the finest of the genuine postwar automobiles.

It has also been disclosed that Cadillac has now spent approximately $10 million of the $15 million allocated for its modernization and expansion program.

Cadillac's new foundry is approximately 80 pct complete, Mr. Gordon reported. Four new cupolas have been built and an entirely new sand system has been installed. Several additional sand slingers and the installation of automatic weighing devices for cupola charging are included in the foundry modernization program. Molding lines have been completely modernized and a new core room is being built. Other changes have been made primarily to improve plant efficiency and provide better working conditions for foundry employees.

DURING the past month Cadillac began operation of its new plating department which is said to be one of the most modern in the Detroit area. When completed, modern facilities will be available for the plating of zinc, nickel, copper and chromium. The zinc plating line is operating at the present time. Other facilities will be completed in the near future.

Cadillac plans to plate its own grilles and a number of miscellaneous parts including nuts and bolts. Facilities for chromite treatment to give additional corrosion resistance are also included in the Cadillac program.

Cadillac's assembly line has been entirely modernized. More floor area has been made available for chassis and body assembly and a new engineering laboratory provides modern facilities for testing parts and materials. The company is apparently overlooking no possibilities in its efforts to maintain a customer acceptance which the management claims is the highest in the automobile industry.

The 1947 Cadillac unveiled this week has a new front grille which is the principal innovation in the latest model. Fender design has been changed slightly to permit the installation of fog lamps under the headlights. There have also been minor changes in the interior construction.

The distinct impression of a long, low front end is retained in the new Cadillac. New color combinations are available to customers who may now chose from the complete Cadillac line which is now in production.

The favorable acceptance of Hydramatic shift by Cadillac owners is indicated by the fact that during 1946 approximately 85 pct of the Cadillac buyers chose Hydramatic at extra cost in preference to the manually operated Synchro-Mesh transmission.

IN introducing the latest Cadillac model to the dealers who will sell the new car, general manager John Gordon explained that the 1946 Cadillac embodied 63 improvements which is the greatest number of changes offered in recent years. "We were unable to find economic, mechanical or aesthetic reasons for drafting changes in the 1947 model," he said, adding that "Cadillac will never change merely for the sake of a change."

D. E. Ahrens, general sales manager, disclosed that the entire Cadillac production for 1947 is already sold out with 75,000 retail orders on hand. While extremely proud of this achievement Mr. Ahrens was careful to warn dealers that this situation could change very rapidly with quick shifts in the economic picture.

He said that despite vexing waits by customers and price increases, cancellations by customers have been at the rate of less than 3 pct. Speaking of plant expansions, the modernization program going on at Pontiac Div. of General Motors is expected to cost more than $30 million. The foundry is being expanded to raise gross tonnage of metal poured from 800 to 1344 tons per day. Increased production facilities are being added to the

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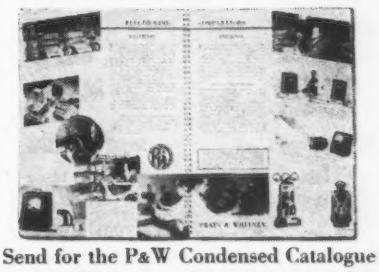

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engine plant, axle plant, sheet metal plant, heat treating and car shipping departments. A completely modern plating installation, said to be the largest in the world, is expected to go in operation during January. New salvage facilities, a gasoline and oil storage building, improvement and rearrangement of the apprentice school are also included in the Pontiac program. Most of the new facilities will be available early in 1947.

PALMER-BEE CO., recently named in a $400,000 portal-to-portal suit has come up with an interesting defense.

Attorneys for the company are contending that, by Federal Court rules, each party to the suit must file his claim individually. This may explain why the portal suit, filed in behalf of Palmer-Bee workers by Local 1297 USW-CIO names only two employees, Frank Suta and John Sirko and adds "all those in like circumstances."

In addition, Palmer-Bee has announced that it would file counter claims for "unproductive work." The company's claims will include time spent in paid lunch periods, paid rest periods, in washing up before quitting time, in lining up at the time clock before quitting time, in returning to productive labor after lunch, time not worked because of tardiness and time spent in "unnecessary general loafing, loitering for their own convenience and in playing games of chance."

Attorneys for the company explained they must know who the plaintiffs are because its claims for "unproductive work" may differ with individual cases.

Meanwhile, the UAW-CIO has adopted new tactics in portal-to-portal pay suits by filing "test cases" on behalf of three individuals.

Suits by individual employees have been filed against Pennsylvania Salt Mfg. Co., Acme White Lead & Color Works and Minnesota Mining & Mfg. Co., respectively.

Each suit asks "in excess of $3000 for the individual worker, but no specific amount is claimed. Thus far, the union has not elaborated on the reason for the change in its legal tactics.

Final disposition has been made in a case of a Ford employee discharged by the management last October on charges of inciting a strike in the openhearth department at the Rouge steel plant. Umpire Harry Shulman, impartial umpire under the Ford-UAW-CIO contract, has ordered the discharged employee reinstated with back pay.

A spokesman for the company has explained that the cases of 14 other employees disciplined in October as a result of a dispute over the use of sodium chloride in the Ford openhearth are yet to be heard.

Announcements of price increases were made this week by Packard and Kaiser-Frazer Corp. Packard's prices become on an average $62 higher per car while Kaiser-Frazer is increasing the price of the Kaiser Special $124 and the Frazer $139. The latest increase raises the factory retail price of the Kaiser Special to $2063 and $2252 for the Frazer. This price includes all charges to the retail dealer except state sales tax, transportation cost and license.

Even with higher prices Packard contends it will lose approximately $80 per car until higher production levels are attained. George T. Christopher, president, explained that this loss did not take into account the possibilities for wage increases during 1947 and alleged portal-to-portal pay.

Buick Using New Setup To Test Engines For Endurance and Power

Flint

• • • **Buick Div.** of General Motors, building a new setup for engine testing, is measuring force and horsepower with new methods, using the Thrustorq, developed by Hagan Corp., Pittsburgh, as the measuring instrument. Results over the past 2-yr has proved so satisfactory to the engineers at Buick that similar devices are to be employed on many different testing jobs.

This is the report of officials in charge of engine testing in the research laboratories at Flint.

One of the first Thrustorqs produced by Hagan Corp., is still in service at Buick and reported doing its job perfectly. It is attached to a dynamometer and is used to measure the results of endurance runs. All of the Thrustorqs so far installed at Buick are used with dynamometers, the original application for which the device was designed. They are of the 12-in. and 30-in. size.

In developing the new testing procedure, it was felt desirable to test Buick engines at approximately the same angle at which they will operate in the finished car. As a result, the present dynamometer installation is tilted 10° from the horizontal. This permits operation of the engine at angles up to 20° without a serious angular deflection in the universal joint which transmits engine power to the dynamometer. If desired, the dynamometer could be mounted at any angle from horizontal to vertical.

Buick is using the Thrustorq for both endurance and power runs. Standard practice involves running the engine for 100 hr and then taking it off the stand. It is then completely disassembled and checked for wear. After the checkup it is again placed back on the stand and run to failure at continuous speeds well above those expected to be developed even in abnormally high speed operation of the finished automobile.

While considerable accuracy has been achieved in the past with weigh scales, when Buick designed its new testing setup by which new motors were to be developed, the research men looked around to see whether any better method of force measurement was at hand. They investigated the Hagan Thrustorq, which measures force as the product of an accurately-measured air pressure acting on a precision diaphragm.

Two other major tests are now being planned, each to be equipped with Hagan Thrustorqs, according to Buick engineers. One will be in connection with a Gleason axle-testing machine. In this test two axles will be hooked together, force being applied in opposite directions. The force applied by the Gleason machine will be measured by the Thrustorq. This test will be carried to failure of the axle.

The second major test installation will be a new chassis dynamometer testing machine. In using this machine the car is anchored so that it cannot move; the wheels, however, turn at road speed, the resulting torque being absorbed by the dynamometer and measured on the Thrustorq.

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• House report condemns growth of big industry . . . Calls for unified monopoly policy . . . Labor unions should be covered . . . Mergers and acquisitions limited.

WASHINGTON — Terming "the long-continued trend toward concentration of economic power into the hands of fewer and larger corporations" the basic threat to a free enterprise economy, the House Small Business Committee has released a staff report calling for vigorous prosecution of existing anti-trust statutes; amendments to existing laws which would limit the right of corporations to merge or acquire additional holdings; increased antitrust appropriations and the establishment of an overall government policy on concentration, covering all segments of the economy, including labor unions. Similar recommendations were made by the President in his first Economic Report to Congress.

The staff report represents the final work of the Committee, which expired with the advent of the new Congress. However, an attempt will be made to continue the committee's work as a Subcommittee on Small Business of the House Interstate and Foreign Commerce Committee. The report does not bear committee approval, but was released for the information of members of Congress with a foreword by the Chairman of the Monopoly Subcommittee, Estes Kefauver, D., Tenn. Two Republican members opposed its release on the grounds that there was no opportunity for rebuttal since public hearings were not held.

Hearings were scheduled to begin shortly before the Congressional elections last fall, but were canceled when it was found that members of the Monopoly Subcommittee could not devote the necessary time to committee meetings.

However, the Republican members agreed that the facts and evidence presented in the report are such as to warrant full and public hearings by the new Congress.

REPRESENTING about 6 month's work on the part of the staff, the report concerned itself largely with an investigation of government activities in combating further economic concentration. Three main phases of government activity are examined—the antitrust program, the small business program, and the activities of a few other administrative agencies. The committee felt that the accelerated trend, and its detrimental effects on free competitive enterprise, had been adequately proved by the work of the Temporary National Economic Committee, Smaller War Plants Corp., and other groups. Therefore, instead of duplicating this work, the staff combined and summarized the work so as to present a consolidated and up-to-date report on the situation.

Less attention was given to concentration of economic power in the hands of the big labor unions for two reasons: (1) Congress has not set forth a concentration policy with regard to labor, and (2) Government agencies do not have the power to deal with this situation, due to the Supreme Court decision in the Hutcheson case.

Information was gathered from lengthy statements prepared by the Federal Trade Commission, the Antitrust Division of the Dept. of Justice, and other government bureaus; business, labor, agricultural, and veterans organizations; and individuals having experience with the antitrust agencies.

Prefacing the major findings, the report states:

"Inasmuch as concentration has increased steadily for the last 50 years, the imprint of failure is everywhere. Even though there are instances of brilliant and positive achievement, individual government officials and agencies are only a part of the larger fabric of government.

"The antitrust record from 1890 to the present time shows brief and infreqnent periods in which the executive agencies have evidenced interest in effective enforcement. It is obvious that had there been continuous public concern about economic concentration this condition would have not have been permitted."

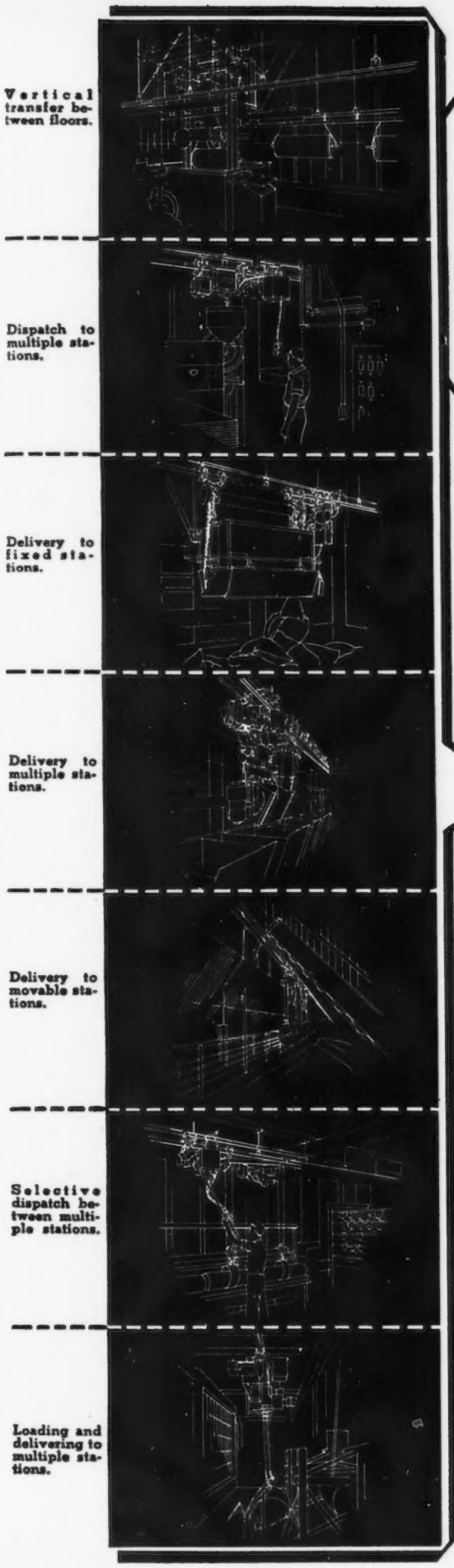
BRIEFLY, the staff's major findings are as follows:

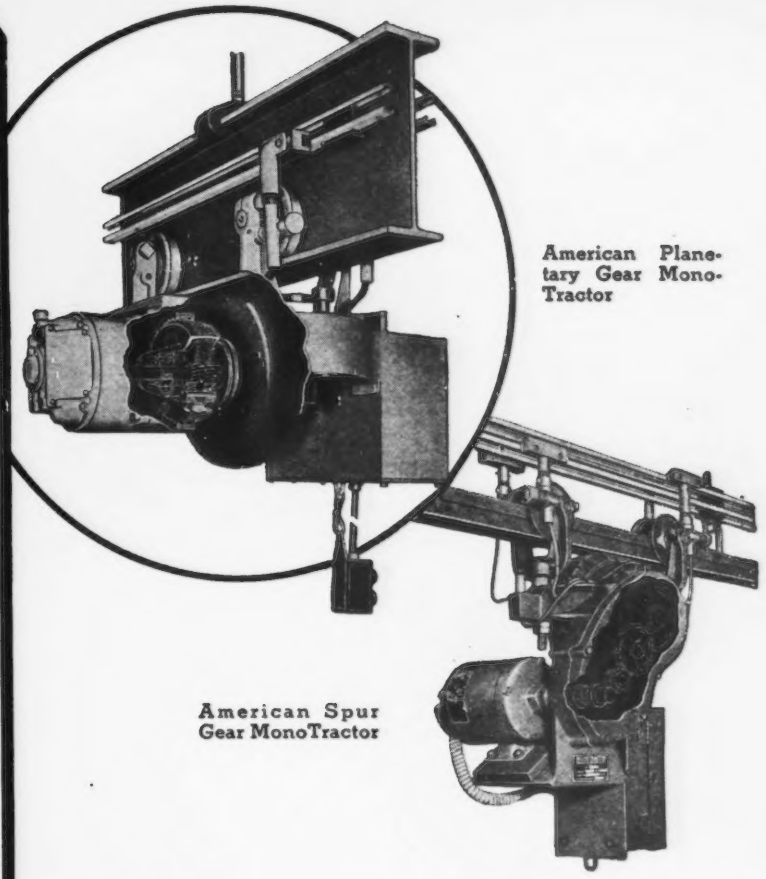
(1)—There was far less economic concentration in the hands of a small number of companies when the Sherman antitrust law was passed over 50 years ago than at the present time.

(2)—Neither the Sherman or Clayton acts have been vigorously enforced.

(3)—Such enforcement as has been attempted has been ineffective due largely to inadequate appropriations and the Supreme Court decisions which nullified Section 7 of the Clayton Act.

(4)—There is no overall government policy in the executive branch regarding concentration. Not only is there lack of interest on the part of some agencies, but in others, notably, War, Navy, WAA and CPA, there are policies which actually promote concentration. The War and Navy Depts. are accused of letting research contracts to a small segment of big industry. WAA, while issuing regulations to help small business and lessen economic concentration, has done


Vertical transfer between floors.
Dispatch to multiple stations.
Delivery to fixed stations.
Delivery to multiple stations.
Delivery to movable stations.
Selective dispatch between multiple stations.
Loading and delivering to multiple stations.



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American Spur Gear MonoTractor

Automatic Carriers

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A 56-page book showing successful applications of American MonoRail Systems.

THE AMERICAN MONORAIL COMPANY

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little to effectuate these policies. Instead, according to the report, sales and leases of surplus plants have contributed to economic concentration. CPA is charged with removing controls without regard to the needs of small, independent enterprises.

(5)—There is also no effective coordinated approach and a tendency to do things piecemeal.

(6)—Antitrust laws do not cover all monopolistic practices, particularly those of labor unions. Both Federal Trade Commission and the Justice Dept. told the committee that they have no jurisdiction, and feel that an independent labor bureau should handle such cases.

(7)—SWPC was an effective aid to small business, but since that agency has been split between RFC and Commerce, little has been done toward lessening the effects of economic concentration.

WHILE the limited number of replies received from business, labor and agriculture expressed concern over economic concentration, but commented chiefly on restrictive practices, the report points out that none of them furnished evidence of "consistent action taken over a period of years directed toward reducing economic concentration."

The staff reports that a review of FTC's antitrust record shows that there is little effort to give first attention to the most serious areas of concentration, and that wihin the last 5 years a disconcertingly large number of cases seems to involve "small fish and seafood companies." While it is pointed out that FTC considers the steel industry as one of the most serious from the standpoint of concentration, the FTC report to the committee shows only one case involving steel since 1932. This was a case against the Bethlehem Steel Corp. under Section 7 of the Clayton Act which was dismissed on May 5, 1939.

FTC, when asked to report the cases handled in the last 5 years, considered to have been the most successful from the standpoint of actually breaking monopolies and retarding concentration, submitted a list of 16 cases, 9 of which covered either price discrimination, zone pricing systems, or basing point systems, including the celebrated corn products case. Nevertheless, the report makes no recommendation on FTC's request for legislation outlawing basing point and zone price systems.

BASICALLY, the report expresses displeasure over the fact that, while FTC wins legal victories, it does not follow up these cases to determine whether these decisions are being complied with or does not attempt to analyze the economic effects, if any.

While the Antitrust Division reported to the committee that "the monopoly problem in industry is today more serious and widespread than at any time since the passage of the Sherman Act," it readily admits its failure in preventing the growth of monopolies and concentrations. The Division states that the basic impediment to its effectiveness is the disproportion of resources, money and personnel for the size of the problem dealt with which has been enormously aggravated by the concentration of the national economy resulting from the national defense program.

Two of the report's major criticisms of current antitrust activities are the delay in handling cases and the legal victories obtained are not necessarily economic victories because of the small penalties involved.

AFTER examining the mass of evidence, the staff came up with the following major recommendations:

Executive Branch

(1) An Executive Order to all departments setting forth a firm and inclusive policy reducing concentration and eliminating restrictive practices.

(2) Investigations of the extent and seriousness of economic concentration on an industry-by-industry and trade-by-trade basis be centered in FTC. It is also recommended that an official index of concentration be continually maintained. This would be a central source of information on the extent of concentration. It is believed that the government could keep such an index up-to-date by using information which it now regularly gathers, but does not use for this purpose.

(3) FTC should review systematically and periodically the results of all antitrust action.

(4) Vigorous action by the Attorney General to reduce concen-

(CONTINUED ON PAGE 114)

THE BULL OF THE WOODS — BY J. R. WILLIAMS

WHAT'S WRONG WITH YOU LOUTS? A GIRL RAN THAT MACHINE THREE YEARS AN' NEVER BROKE A DRILL -- YOU DEMOLISH 'EM BY TH' CASE!
WHEN HE ADMITS THEY WERE GOOD, IT LOOKS LIKE TH' LADIES ARE COMIN' INTO THEIR OWN AT LAST!
HE WAS AGIN GIRLS IN A SHOP CUZ THEY MADE HIM FEEL LIKE A FLOORWALKER -- NOW THEY'RE GONE, HE USES 'EM TO MAKE US FEEL LIKE SLEEP-WALKERS!
1-17 J.R. WILLIAMS
STILL USING 'EM
COPR. 1947 BY NEA SERVICE, INC. T. M. REG. U. S. PAT. OFF.

SHEFFIELD MACHINE TOOL DATA

TFG - #123-4

NEW PRECISION ANNULAR FORM GRINDER FOR CRUSHTRUE GRINDING

Sheffield announces a Precision Annular Form Grinder as an addition to its line of precision grinders. This new machine utilizes the Crushtrue principle of wheel dressing for the rapid production of cylindrical forms such as circular form tools, crusher rolls, ball bearing races and seals, shift grooves in automotive and farm implement transmission gears, and other annular forms of intricate and precise profile.

MACHINE FEATURES:

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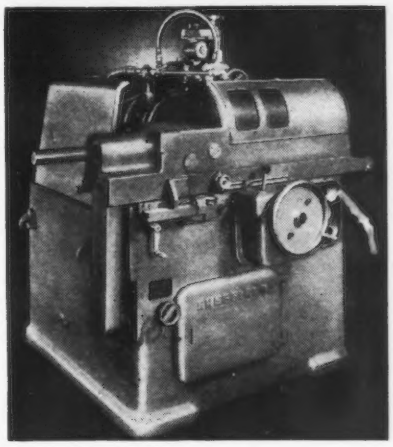
Infinitely variable work speeds
Semi-Automatic Power Crushing
Wheels form dressed up to 2" face
Swings 7" work 12" between centers
Precision work spacing device



Write for Engineering Data TFG 123 and 124

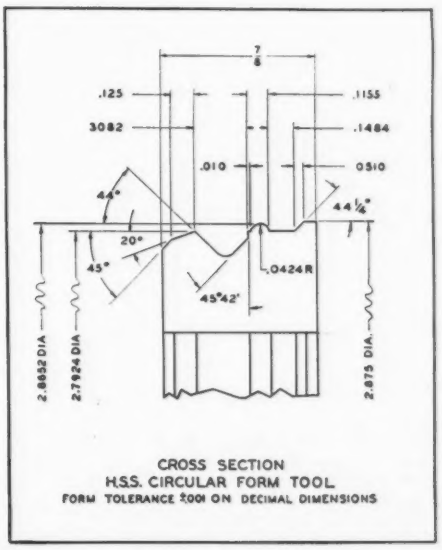
GRINDING TIME CUT FROM 4½ HOURS TO 4 MINUTES

This circular tool has a contour involving a blend of radii, straight sides, angles and flats. Prior to using the Crushtrued full form wheel, the work had been made on universal cylindrical grinders by toolroom procedure in lots of 15 to 30, and the grinding time of 4½ to 5 hours per tool was considered top performance.

A master Crushtrue Roll, made on the Micro-Form Grinder, was used to true the wheel on the Precision Annular Form Grinder shown above.

Grinding from the solid required 13 minutes. Grinding on preformed stock having approximately .020" on a side required less than four minutes.

The time required to make the Crushtrue roll compares with that of making the circular tool by conventional means. Therefore, the crush grinding process would show savings that become phenomenal as the quantities increase.



CROSS SECTION
H.S.S. CIRCULAR FORM TOOL
FORM TOLERANCE ±.001 ON DECIMAL DIMENSIONS

Previous grinding time	270 minutes
Crushtrue grinding time	4 minutes
Time saving	266 minutes
Percent Time Saved	98.5%

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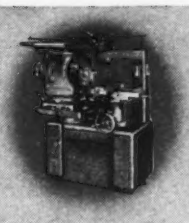

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West Coast . . .

ROBERT T. REINHARDT

• New low freight rate granted Geneva Steel Co. adds to price confusion . . . Kaiser-Frazer Long Beach plant ready to roll . . . Nonferrous metal mining faced with new tax problem.

SAN FRANCISCO — If any buyer on the West Coast knew just how much he was going to pay for steel ordered the latter part of last week he should be dubbed the man of distinction for the industry.

While sales departments, traffic men and market analysts burned the midnight oil attempting to figure out just what delivered prices would be after virtual abandonment of arbitrary basing point prices on the Coast, western railroads added a bit to the confusion by announcing reduced rates from Geneva to West Coast points.

Decision of western railroads to publish a rate of $9.60 per ton on steel from Geneva, Utah, to San Francisco Bay points, Los Angeles and Portland and a rate of $10.80 per ton to Seattle, is a major victory for the Geneva Steel Co. which requested an $8 rate to these points in July 1946.

In effect, considering the general 20 pct or 10¢ per hundred maximum increase allowed all roads effective this month, the western roads granted Geneva's request fully with the exception of the differential to Seattle. Under the general increases allowed this month the rate from Geneva to Coast points was $14 instead of the $12 in effect when the $8 rate was requested, and on this basis the new rate of $9.60 per ton is on a par with the $8 rate asked for.

Original announcement of the lower rate stated that participating railroads were: Denver & Rio Grande Western, Union Pacific, Great Northern and Western Pacific. The Southern Pacific Railroad had not announced acceptance of the lower rate and it was recalled that this road had also never carried steel during the war from the Geneva plant to the Coast at the special government rate of $8 per ton, or the "Section 22" rate.

COMPETING producers of steel in the West did not oppose the request of the Geneva Steel Co. in July and this announcement of the new rate served only to bring out reiteration of the points made at the first hearing on the rate structure. At that time both Kaiser Co., Inc., and Bethlehem Pacific Coast Steel Corp. served notice that if a rate reduction was allowed, they would expect parity adjustments on raw material shipments and coastal movements of finished products.

It is expected that concerted efforts will be made by these companies to bring about such reductions, and that further ramifications of the lower rate will include appeals for adjustments by eastern producers and possibly steamship lines. The Kaiser company finds itself faced with Geneva's ability to now ship steel from Utah to Portland for 48¢ cwt while it must pay 67½¢ for the Fontana, Calif., to Portland haul; and Geneva pays 54¢ from Utah to Seattle while Kaiser pays 67½¢ from Fontana to Seattle.

With the buyer paying the freight and demand exceeding supply, these differentials may not be too important, but when competition for business begins in earnest the situation will change quickly. It is certain that the Kaiser organization will not miss this opportunity to work for lower costs on ore and coal hauls and an aggressive follow-up on petitions now on file with the railroads is anticipated.

The Pacific Northwest fares well in this decision on lower rates although Seattle is expected to object to the differential of $1.20 over the Portland rate. When Section 22 was in effect the rate to Seattle was $10 per ton and to Portland $9.50 per ton.

LONG BEACH, CALIF.—Workmen are now putting the finishing touches on the $4,500,000 southern California division assembly plant of the Kaiser-Frazer Corp. which, when placed in operation, will have a capacity of 50 cars per hr or 400 cars per day on a one-shift basis. When peak production is reached, approximately 3500 persons will be employed.

Kaiser-Frazer Corp. is occupying a portion of the former Douglas Aircraft plant at Long Beach, where work has been in progress since last March to reconvert part of the facilities from an aircraft plant to an automobile assembly plant. The new automobile firm now occupies two of the large aircraft production buildings, which provide 540,000 sq ft of covered ground-floor space, plus a portion of one of the adjacent office buildings.

To reconvert the aircraft plant for automobile assembly, Kaiser-Frazer has constructed 15,000 ft of railroad track from a Union Pacific spur near the plant; installed 12,110 ft of conveyor system, consisting of 9380 ft of floor conveyor and 2730 ft of overhead conveyor; constructed baking ovens, paint booths, Bonderite units, paint mixing and circulating systems, unloading platforms and innumerable other assembly installations in 9-months' time to bring the plant to its present form, virtually ready for automobile assembly operations. However, production will not begin until sufficient material is available to maintain Willow Run at its present production rate and provide a surplus of materials for operation of the Long Beach plant.

It is anticipated that 50 pct of the parts and accessories for the Kaiser Special will be provided by Pacific Coast manufacturers, although body stampings, motors and other similar parts will be shipped to the southern California plant from the Willow Run plant.

Counting on Quality

A product which, on sight, represents quality, dependability, superior service to the ultimate consumer is a hard-won, priceless asset to its manufacturer. Transue, designers and producers of deep drawn stampings, is proud of its long affiliations with many such manufacturers of well-known products. Their repeated orders to Transue are recognition of a consistent quality in T & W parts, comparable to the quality for which their own finished products are recognized. These manufacturers know they can count on Transue's unvarying attention to uniformity, rigidity, finish and other desired physical properties.

Sales Offices:
New York, Philadelphia, Chicago
Detroit, Indianapolis, Cleveland

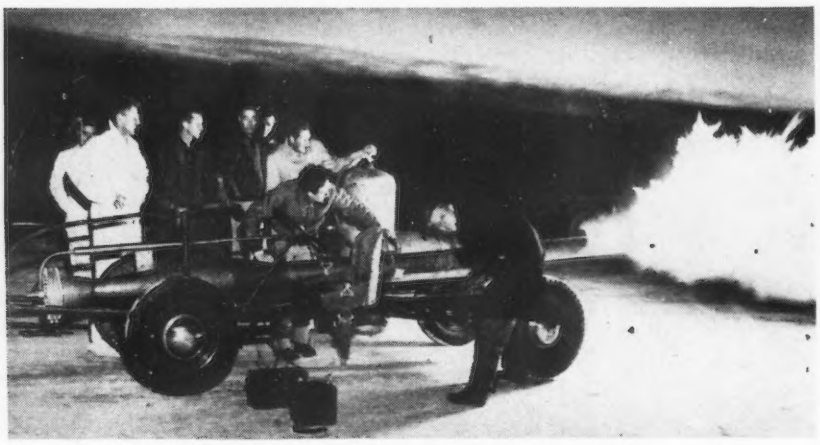
In addition to assembling Kaiser-Special cars at Long Beach, the Kaiser-Frazer Corp. will also assemble an agricultural machine at the southern California division, known as a Rototiller. This machine will be made for the farm equipment division of Graham Paige Motors Corp. Thirty thousand units are scheduled for assembly within a year after start of operations. The Rototiller is a farm machine which performs the work of a plow, disc and harrow in one operation.

CONSTRUCTION progress is reported on the new Chevrolet assembly plant at Van Nuys, Calif., with all concrete poured on or below ground level, and erection of steel now under way. The first steel arrived at the plant site recently, and of the total of 7500 tons that will be used, approximately 3000 tons has been received and has been erected, or awaits erection. The two-story main assembly building, to be used for Chevrolet and Fisher Body assemby operations, will be 600 ft wide and 800 ft long.

Completed and in operation is a parts warehouse, to serve this area, located on the plant site. Seven spur tracks, to serve the assembly plant and the parts warehouse, for incoming and outgoing shipments, have already been laid by the Southern Pacific Co. Smaller buildings also under construction as a part of the assembly plant operation include two pump houses, a car-loading building, and a building for the manufacture of acetylene gas. It is anticipated that construction will be finished during 1947.

SALT LAKE CITY—The Utah supreme court handed the nonferrous metal mining industry a rude shock a few days ago by holding that premiums or bonuses paid by the government must be included in gross and net proceeds for tax purposes. The lower state court had held that the premiums were a bonus offered as an inducement for production and did not constitute a part of the metal price within the meaning of the state tax laws, but the supreme court reversed that decision with one dissenting opinion.

The next step will probably be a petition for rehearing. If the mine operators are unsuccessful in that they may try to get into the U. S. Supreme Court, despite the fact that they have already lost one round in that court. In the test cases which went up to the U. S. Supreme Court, the U. S. district court in Salt Lake City held the premium payments were not part of the tax base. The circuit court of appeals tossed the issue back to the state on the grounds that it had no jurisdiction because the cases were suits against the tax commission and therefore against the state. The supreme court affirmed the ruling of the circuit court of appeals. But mining lawyers, who have filed subsequent suits against the counties instead of the state, think they might be able to get the issue to the Supreme Court again for a review.



NIGHTMARE ALLEY: *Gene Kelly, center, adjusts fuel valves of a jet racer which he and three other mechanics built in Los Angeles. It appears that the car will do quite nicely on an empty track but the net effect on drivers following it around a speedway is still undetermined.*

West Coast Consumers Eye New Steel Costs

San Francisco

• • • **Slide rules and calculating** machines were kept busy last week as warehousemen, jobbers and other steel buyers attempted to figure out how much steel was actually going to cost them delivered to their doors since most suppliers have abandoned arbitrary delivered basing point prices on the Coast.

Purchasers starting with the base price at suppliers mills are having to add all hauling and switching charges from the point of origin to their plants and often find themselves on unfamiliar ground. A spokesman for warehousemen in this area said, "This is the most confusing price period in local history and we frankly don't know yet what our costs are, yet alone our resale prices. We are dealing in fractions and trying to weigh all of the conditions and 'ifs, ands and buts' thrown at us by the mills."

Price lists of local major suppliers are undergoing revisions and will no doubt clarify the situation when released, but as one representative said, "Prices mean little anyway, and buyers are willing to place almost any order we accept subject to prices not yet announced and regardless of the cost of shipping."

Practically all shipments of sheets which have been made into this area since lifting of OPA ceilings have been on an f. o. b. mill price and hence this commodity is well stabilized by now. However, other products are causing headaches.

Says Car Registrations Will Reach 1,750,000

Detroit

• • • **A prediction that** new passenger car registrations for the entire year 1946 will reach 1,750,000 has been made by R. L. Polk & Co. statisticians for the automobile industry.

New passenger car registrations for 24 states for November totaled 55,928 as compared with 42,773 units for the same states during November 1941. The Polk estimate for the country for November is 225,000 new cars sold.

PHOTO COURTESY OF AMERICAN AIRLINES, INC.

Signal Caller of the Skyways

A lowering sky, alive with passenger-filled planes waiting to land . . . the concrete apron of the busy airport jammed with other flights ready to take off . . . impatient travelers . . . eager relatives and friends.

Aloft, each circling pilot eyes his fuel gauges . . . contacts the control tower for landing instructions by radio. It's the job of the tower operator to direct the planes to the safety of the runway . . . to keep traffic moving even when skys are heavy and the ceiling is low. But this task is nothing new to the tower operator, for his tediously-gained experience enables him to call, quickly and accurately, the signals in the whole complicated procedure of directing the traffic of the skies.

It is experience, too, that enables Twin Disc engineers to meet the unusual demands in designing and building power transmission units of all kinds. The Twin Disc Clutch Company has been designing, building, selecting, and applying the right clutch or hydraulic drive for specific jobs for 28 years.

If you have an unusual power transmission problem, take it to Twin Disc's experienced engineers. They will give you unbiased and reliable recommendations.

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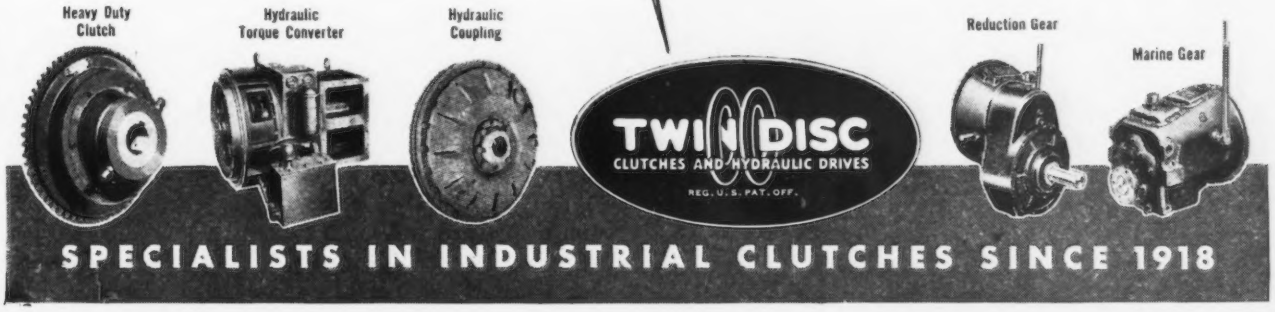
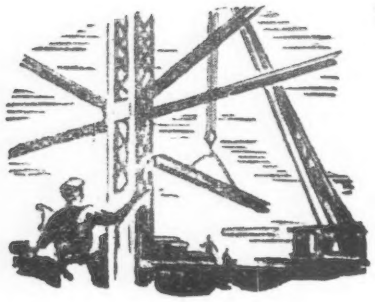


European Letter . . . JACK R. HIGHT

• Start of year finds the coal pits and the cable and wireless services in government hands . . . Steel is expected to maintain present status for a while at least.



LONDON — The arrival of 1947 finds Great Britain in the middle of an important transition, with the first day of the year marking the effective date for No. 3 and No. 4 of the Labor Government's nationalization plans. As of the first of this year the coal pits fall actively into government hands, and the internationally known cable and wireless services also go out of private control.

These steps were quietly taken, in comparison to the newspaper space they merited when the plans were under discussion. Small formal ceremonies, and pontifical public statements by the appropriate government ministers marked the climax of these two actions.

Following after the Bank of England, which was the first to go, and the civil airlines, No. 2, the mines and the communications services acts were passed some months ago. Preparations have been going on for some time for the actual transfer of the properties involved, and Jan. 1 was set as the "vesting" date for the two industries. These transfers complete those industries where legislation is in existence authorizing the government to nationalize.

Now in store for the United Kingdom economy is the legislation for the public transport industries and the electricity field. These measures have already been presented to the present session of the House, and are now in the process of being hammered into the law of the land. Under the parliamentary system, with the strong control of the House which the present government maintains, the actual passage is completed rather in the same fashion that the 1932 Congress stamped out emergency legislation for the late President Roosevelt.

At the same time, the pressure of normal business plus the trying transitional period in India, Egypt, Palestine and Burma will make it unlikely that any further legislative action will be taken in the broad nationalization program until the next session of parliament convenes late in 1947.

ALL things considered the British public is taking the nationalization of the basic industries with what in America would be considered a remarkable calm. There is some basis for comparison with the attitude of so many Frenchmen, who say that if there must be a Communist experiment in France, let's get on with it. Part of the relatively quiet acquiescence may be attributed to the much greater amount of public control which has been applied to certain industries in the past, and to the conviction on the part of many Englishmen that the prewar system was one of private monopoly, rather than one of free private enterprise.

No doubt the bitterest struggle which has taken place to date in the government versus industry battle as the nationalization program develops was that one which I reported in so great detail on the steel industry in the summer of 1946. The paradox is that here where the greatest battle took place there has as yet been no legislation introduced by the government to bring about the public ownership of the industry. In the case of the Bank of England, the government control had been so thorough during the prewar years that most people considered that in effect the government was running the bank. In addition, the terms by which the treasury acquired the shares in the bank were such that the market value increased after the program was announced.

As far as the enactment of the civil aviation bill was concerned, there was no strong prewar private industry to fight the government. From the domestic standpoint the small operations developing before the war were shut down during hostilities, and the companies involved were in no position to create effective opposition. The international services were already organized under a government corporation, the British Overseas Airways Corp., which has served as a model for the other government

NEW COAL COMPANY: *The British Government celebrated the New Year by officially taking over the country's coal mines at a party given by the Ministry of Fuel in London. Cabinet members listen to Prime Minister Clement Attlee, with Mr. Shinwell presiding as Minister of Fuel and Power. Others, left to right, are Herbert Morrison, Sir Arthur Greenwood, Ernest Bevin, Aneuran Bevan (rear) and Sir Stafford Cripps.*

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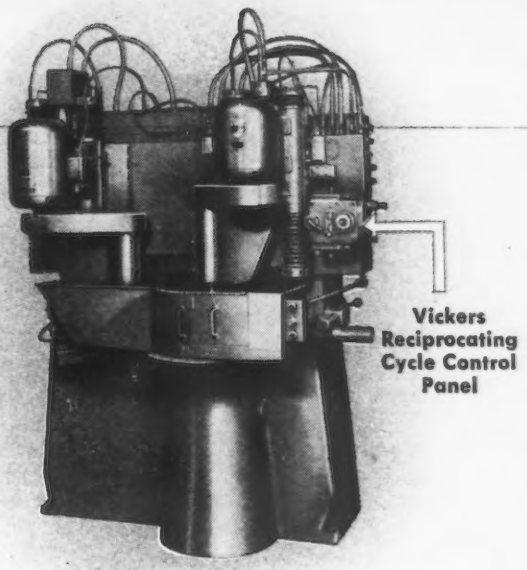

Springfield Special Purpose Grinder

The manufacturer has utilized Vickers Hydraulic Controls on this special purpose grinder to provide an important increase in production, better work finish, simpler operation, and protection for the operator, machine and work.

The machine grinds the backface and bore of the ring gear in one setup. Each grinding wheel is reciprocated hydraulically in proper sequence. All phases of machine cycle operation are interlocked hydraulically to prevent damage to work and machine.

Vickers Reciprocating Cycle Control Panel provides smooth reciprocation of grinding wheel, thus providing better finish. Stroke lengths are adjustable and maintained accurately thus eliminating unnecessary and time-consuming overtravel for a specific setup. Adjustable speed hydraulic drive of work spindle makes possible the best combination of speeds for better finish.

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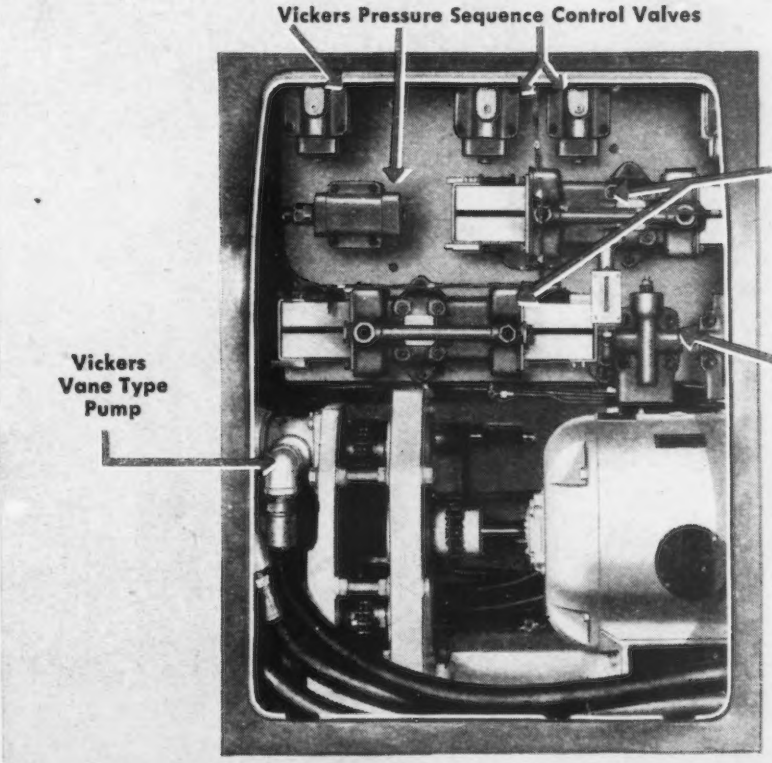
ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921


Vickers Pressure Sequence Control Valves
Vickers Solenoid Operated Control Valves
Vickers Vane Type Pump
Vickers Balanced Piston Type Relief Valves

Rear View of Springfield Grinding Machine with Cover Plate Removed

corporations which have been set up for the remainder of the industry.

THE government also had a strong interest including a share in the ownership of Cable & Wireless Ltd., and this transition was completed without much of a stir. The mines caused the most public debate, but the British Labor Party was formed with one of its basic premises being the nationalization of the coal operations, so there was little choice, if indeed the idea was ever questioned. The mine owners put up a token battle and made a number of public utterances denouncing all concerned, but long before the vesting date arrived they had accepted the idea.

On the steel question, the whole matter was aired prematurely because the government was shoved into the idea that much good would come of announcing publicly that without a doubt nationalization was coming, and that the industry should govern its modernization plans accordingly, primarily by making as much progress as possible. So the government made such a statement, and a debate was held, and the government's ultimate intention of nationalizing was approved by a vote of the House. The steel industry's trade association decided that the time to start the fight was then, and the chairman of the body, who most opportunely is also a member of the House of Commons, led off the battle for the industry in the House debate. He stated that the idea of the industry was to go along as prewar with the strong trade association dictating to the industry, and an increased measure of government control over the trade association.

His ideas were as a matter of form rejected by the government, who later asked his assistance in his alter ego capacity as independent chairman of the British Iron & Steel Federation to nominate some men for a new Iron and Steel Board to control the industry. Backstage shuffling went on until the government had agreed that the board would not be forced to deal with plans for nationalization, and then the federation chief decided that he could see steel leaders serve on the board.

IT IS doubtful if all of this maneuvering both in public and in private did a great deal to advance the cause of either steel industry modernization or of nationalization. It did serve to make known to the public at the time of the debate the government's determination to nationalize steel, although many rumors have been planted as the battle developed that the cabinet had reluctantly changed its mind in the matter.

With a new control board administrating in the industry and no room in the legislative session for another major nationalization bill, it seems likely that steel will ride along in its present state for another few months.

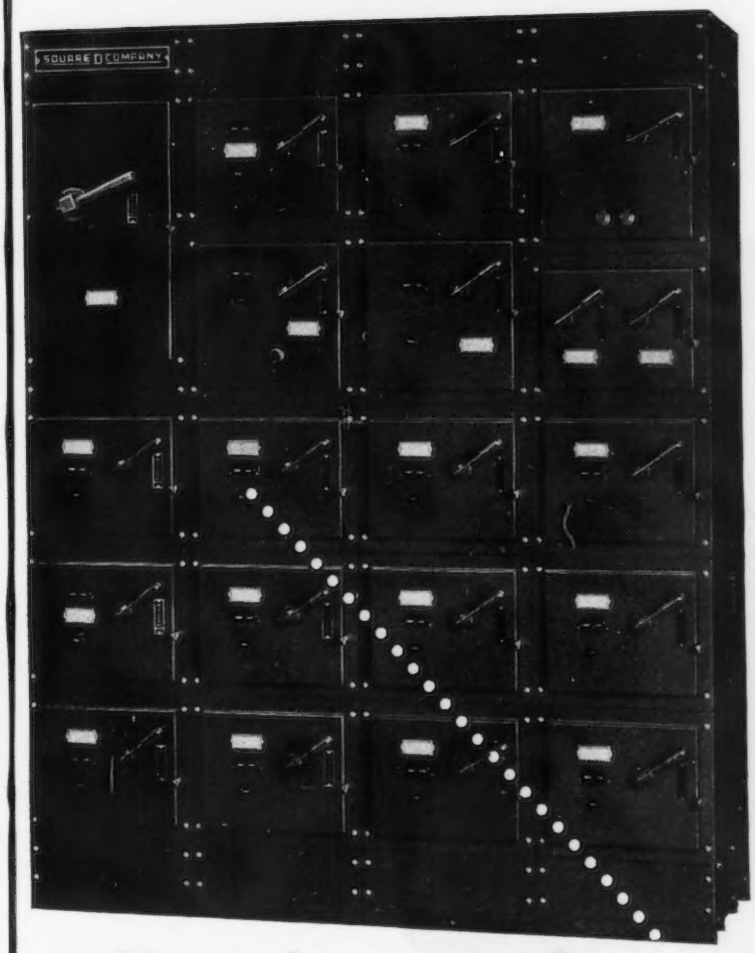
In the operation of the mines the government has inherited an immediate as well as a long-range problem. The onset of the two difficult winter months here in the United Kingdom has brought the ever-present coal shortage into sharp relief, as a compulsory cut has been applied on some "nonessential" industries and more are in the offing. There has been a rash of local newspaper talk about individual industrial establishments being threatened with shutdowns because of inadequate supplies, particularly in certain regions of north-central England where supplies were held up in shipment due to fog.

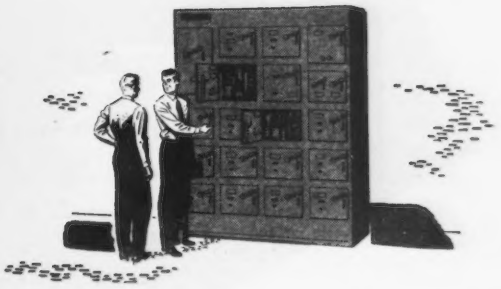
The Austin Motor Co. also made headlines over the holiday period by dramatically announcing that its 14,000 workmen would be laid off and the entire plant shut down after Christmas due to a shortage of coal. Despite other harassing year-end problems, the Minister of Fuel immediately took steps to send emergency supplies to the motor company, and, as was no doubt intended by the management, the threatened lay-off was avoided. In my opinion some of this action may have been motivated by a desire to get more coal rather than by a sheer inability to operate, and some sources even feel that managements who are largely in opposition to the government hope to embarass the labor party by so doing.

THERE is no doubt, however, that some difficulty was caused in the Midlands by a 3-day siege of fog, and this being the case it seems evident that industry in particular is operating on very slim margins as far as coal supplies are concerned if a brief interruption can threaten the operations of such a number. In the long-term prospect the problem is to get Britain back into her prewar position as an importing coal exporting nation, and this too will require considerable effort. A national manpower shortage will preclude the possibility of greatly increasing the number of men presently employed in the mines, and increased mechanization is being hampered by a shortage of facilities for producing new types of mining machinery.

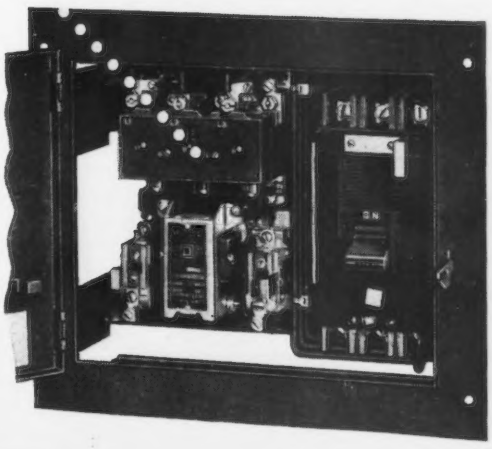
ROYAL CRUISE SHIP: *The new 45,000-ton battleship H.M.S. VANGUARD on a shakedown cruise as she left Portsmouth. This is the ship that will carry the British royal family to South Africa in February.*

A PART OF SQUARE D's PARADE OF NEW DESIGNS





Here is a good reason for specifying *Square D* CONTROL CENTERS



• Control centers permit low-cost grouping of starters in favorable locations. They offer the basic advantages of attractive appearance, compactness, easy installation, convenient maintenance and adaptability to future change or expansion.

You get better performance in Square D Control centers because each of the basic advantages is greatly increased by the time-proved design and operation of Square D Starters plus the inherent value of Circuit Breaker protection.

Call your nearby Square D Field Engineer for complete details.

SQUARE D COMPANY

DETROIT • MILWAUKEE • LOS ANGELES

Dear Editor:

NEW ALLOY GT-45

Sir:

In the "Newsfront" feature of the Nov. 21 issue, a new high temperature alloy, GT-45, was mentioned. Can you give us any further information about this material?

E. A. SCHROEDER
Engineering Dept.
Eastman Kodak Co.
Rochester, N. Y.

● GT-45 is a development of Rustless Iron & Steel Div., American Rolling Mill Co., Baltimore, Md. Detailed data have not been released as yet.—Ed.

ANNUAL REVIEW COMMENT

Sir:

I want to compliment you and your associates on the extraordinarily high quality of the Annual Review number of THE IRON AGE. It is difficult to recall when I have read as much of any issue of a magazine as I have read in that number and with as much enjoyment and profit.

I want especially to compliment you on the article discussing geographical distribution of consumption of iron and steel products. That is a line of information in which I have long been deeply interested and I was particularly glad to see the success which had marked your effort to develop data along that line.

WALTER S. TOWER
President
American Iron and Steel Institute
New York

CARBIDE TOOL

Sir:

Can you advise us where we can secure additional information regarding the carbide tool for finishing valve guide bushings, referred to on p. 116 of the Dec. 26 issue?

J. A. FYFE
Vice-President and Secretary
Seneca Falls Machine Co.
Seneca Falls, N. Y.

● The tool you are interested in has a carbide tip brazed to a carbide shank and is a product of the Carboloy Co., Inc., 11153 E. Eight Mile Rd. Detroit 32, which we feel sure will be glad to furnish you with additional data.—Ed.

OUTBOARD MOTOR PARTS

Sir:

Unless you have any objections, we are reprinting, for one of our clients, the article, "Die Casting Outboard Motor Parts" by Herbert Chase, which appeared in your Aug. 15 issue. Of course, we are giving due credit to your magazine.

JOHN H. KUEKES
Industrial Dept.
Gregory & House Inc.
Cleveland

● You have our permission to reprint "Die Casting Outboard Motor Parts."—Ed.

ALUMINUM CASEMENTS

Sir:

I have been advised by your London office that you could give me assistance with my problem. We are making steel window casements and the government is pressing for utilization of aluminum sections owing to the shortage of steel. I have noticed that aluminum casement sections are already being flash welded in America. . . . Could you supply me with articles you may have published on the subject. . .

V. ALLEN

Compton Rd.
Kinver, England

● The article, "Battery Powered Aluminum Flash Welder," appearing in the Dec. 26 issue, describes a machine which can be used for flash welding miter joints of extruded aluminum window sashes. We are forwarding tear sheets, together with other recently published material on aluminum welding, hoping they will be of some value to you.—Ed.

NO GAS EXPLOSIONS

Sir:

We note in the Dec. 5 issue, in "Newsfront," the statement: "Most of the publicity and sales pressure has been taken off gas-fired home heaters in the built-up sections of the East. Further installations on a large scale would exceed the capacity of existing mains and threaten explosions." The facts are that gas making capacity for a possible zero or subzero day is deemed to be insufficient in some places to risk added sales of gas furnaces for the home. If gas generating capacity plus stored gas on hand were really exceeded, gas companies would undoubtedly have to resort to lowering the gas pressure. . . Pressure reduction would cause automatic pilot operated appliances to shut themselves off, i.e., when the pilot flames diminished to the point where they could no longer hold the thermal element open. With the house heaters shut-off, substantial load reductions naturally would take place.

From the foregoing you will see that the only threatened explosions are destined to come from the prospective customers who may have a short period of time to forego the use of gas as the ideal home heating fuel.

GEORGE A. McDONALD
Director of Publicity
American Gas Assn.
New York

NEW PRODUCT SETUP

Sir:

I have just read with great interest the article, "Setting Up for a New Product," by Lee S. Whitson, published in the Nov. 7 issue. This article is of particular interest to me because it deals with a problem continually facing our organization. I, therefore, would appreciate eight reprints for use by our Management Committee members.

WILFRED P. JUCKEN
Production Engineer
Eagle Signal Corp.
Moline, Ill.

● Since reprints have not been made of the article, we are sending all available tear sheets.—Ed.

BICYCLE REQUIREMENTS

Sir:

In "Newsfront" of the Dec. 12 issue, we notice an item indicating a British estimate of world requirements for bicycles. Can you furnish us with any more details, such as a breakdown by countries, that may have been contained in the article which you summarized? I cannot let this opportunity pass to tell you how valuable and interesting we find your "Newsfront" feature.

GUY A. WAINWRIGHT
President
Diamond Chain & Mfg. Co.
Indianapolis

● The only other data we have are that of the 1,360,000 bicycles manufactured by the British during the first 10 months of this year, 816,000 were for export, and it is estimated that during 1946 well over 1,000,000 will be manufactured for export. This compares with 650,000 bicycles exported in 1938 when the total output was 2,600,000.—Ed.

THE DROPPED ZERO

Sir:

Referring to a statement on p. 106 of the Dec. 5 issue, permit me to call attention to the fact that 1 billion Swedish Crowns equals $266,666,-666.00, or 10 times the figure you give. . .

OSCAR R. WIKANDER
900 S. Negley Ave.
Pittsburgh 6

● Thank you, Reader Wikander. A cipher was lost.—Ed.

PLASTIC PATTERNS

Sir:

I would be interested in obtaining tear sheets of the article, "Precision Casting With Plastic Patterns" which appeared in your Nov. 15, 1945, issue.

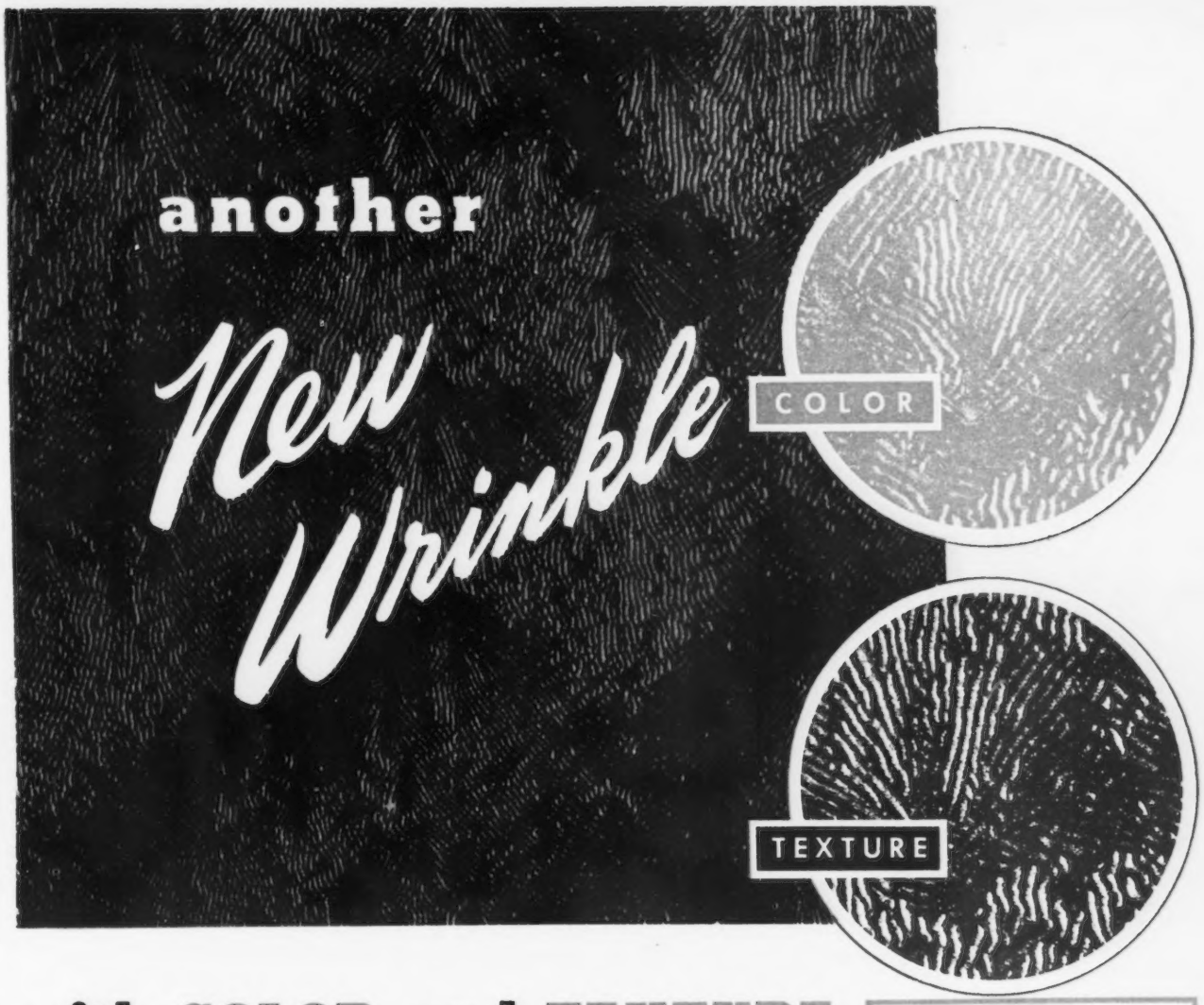
JAMES G. ZACK
Monsanto Chemical Co.
Springfield 2, Mass.

SELECTING CAST IRON

Sir:

I would like to obtain a reprint of the article, "Selecting the Correct Type of Cast Iron," appearing in the Oct. 17 and 24 issues.

T. E. CUSHING
Engineering Div.
SKF Industries, Inc.
Philadelphia



with COLOR and TEXTURE

Texture and color are only a part of the Wrinkle story. Economy, durability, production time-saving are other parts of the story of the most versatile of all industrial coatings.

If you are not already using Wrinkle, it will pay you to investigate. And if you are among the thousands of users, you'll be interested in new developments in Wrinkle . . . for instance, in the synthetic rubber-base, and resin emulsion-base flexible Wrinkle coatings.

There are literally hundreds of controlled Wrinkle textures, and an unlimited variety of color combinations for every conceivable application to either flexible or non-flexible surfaces. No other industrial finishing material offers so much in distinctive decoration and protection.

Eye-appeal . . buy-appeal . . long-lasting protection . . and unequalled production economy are the unmatched characteristics of versatile Wrinkle.

Write for "New Wrinkles in Finishing," . . . bi-monthly report on Wrinkle developments and applications. It lists approximately 200 manufacturers of Wrinkle finishes and coatings. One or more are near you.

Your Competitors in these fields are using Wrinkle coatings on:

CASTINGS
STAMPINGS
PRESSINGS
FORGINGS
DIE CASTINGS
MALLEABLES

If you are not now using Wrinkle, call in your supplier of industrial finishes, or write us direct, for further information on inexpensive Wrinkle coatings.

New Wrinkle, Inc., Wrinkle REG. U. S. PAT. OFF. *Offices and Research Laboratories.* **1765 Springfield St., Dayton 3, Ohio**

Flexible Wrinkle for coating paper, fabrics, rubber, plastics and artificial leather.

Any industrial finish manufacturer who maintains our standards is eligible for a Wrinkle license.

√ Office equipment, typewriters, adding machines, etc. √ Electric motors and tools. √ Tool chests and cabinets. √ Scientific and precision instruments. √ Photographic equipment. √ Castings and fabricated metal parts. √ Caskets.

PERSONALS

o o o

• **Robert C. Judd** has been made market research manager of R. G. LeTourneau, Inc., Peoria, Ill., to study applications of present equipment to present markets; analyze applications of present equipment to new markets; and study new markets for potential development of new products. Mr. Judd replaces **Wendell Richards,** who resumes his district sales representative activities.

• **Charles N. Chalfont** and **John E. McCarthy** have been added to the industrial department service staff of Wyandotte Chemicals Corp., Wyandotte, Mich. Both were given practical training courses in several Wyandotte territories before being given their Ohio assignments—Mr. Chalfont to Dayton and Mr. McCarthy to Columbus.

• **T. R. Kelley** has joined the retail division of The Buda Co., Harvey, Ill., as a field engineer and will cover the territory embracing northeastern section of the United States and eastern Canada. Mr. Kelley will make his headquarters at the Buda Engine & Equipment Co., Boston.

• **W. H. Gourlie** has been named exclusive sales and engineering representative for The Kelly Reamer Co. in the State of Connecticut with the exception of Fairfield County, and in the State of Massachusetts, the Counties of Berkshire, Franklin, Hampshire and Hampden.

• **Erwin J. Meury** has joined Reynolds Metals Co. as a specialist in the sale of aluminum beer barrels. Mr. Meury will concentrate on the sale of beer barrels being made from Reynolds aluminum by the Benson Mfg. Co. of Kansas City, Mo.

• **C. E. O'Connor,** formerly manager of the Syracuse, N. Y. branch of the Crucible Steel Co. of America, has been appointed a consultant to the company. **H. B. West,** previously sales representative and office manager, has been appointed manager of the Syracuse branch.

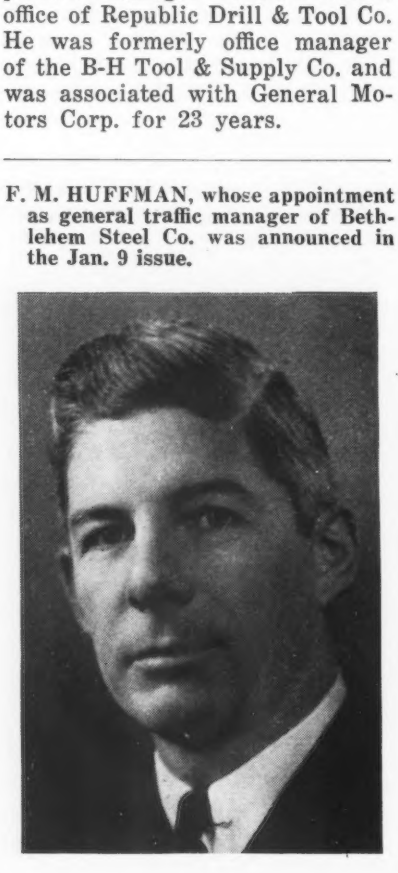
• **William L. Aiken** has joined SKF Industries, Inc., as senior division engineer in charge of the automotive and marine department. Mr. Aiken was executive engineer of the Autocar Co., Ardmore, Pa., before becoming associated with SKF. He also has served with Wright Aeronautical Corp. and Buick Div. of General Motors Corp.

• **E. T. Cuddeback** has been appointed representative of the Allis-Chalmers Mfg. Co. in the firm's Atlanta, Ga., district office. Mr. Cuddeback joined Allis-Chalmers in June 1946, having spent nearly 5 yr in the U. S. Army Air Forces.

• **Harry T. Woolson,** executive engineer of the Chrysler Corp., has resigned after 25 years of executive engineering duties with the company. He was appointed to his present office in 1935 and was also president of Chrysler Institute of Engineering and vice-president of the Marine Div. Mr. Woolson joined Chrysler in 1925 in the capacity of chief engineer. He is a past president of the Society of Automotive Engineers (1937).

• **Gale H. Fisher** has been appointed manager of the Detroit office of Republic Drill & Tool Co. He was formerly office manager of the B-H Tool & Supply Co. and was associated with General Motors Corp. for 23 years.

F. M. HUFFMAN, whose appointment as general traffic manager of Bethlehem Steel Co. was announced in the Jan. 9 issue.



• **P. B. Haythorne,** superintendent of transportation at the Indiana Harbor works of Youngstown Sheet & Tube Co., has retired. He began with the company as an expediter in May 1920. Also retiring are: **Henry C. Moore,** superintendent of shipping at South Chicago works, after 54 yr with the company; **Frank Heydorn,** chief of the property protection department at South Chicago works, who joined the company in August 1920; **Lewis Washburn,** assistant superintendent of the skelp mill at Indiana Harbor, who has been with the company 29 yr; **Arthur Gasche,** management representative, after 21 yr with the company and 52 yr in the steel business; and **Leonard Syler,** carpenter and foundry foreman, retires after 51 yr at the South Chicago works.

• **Stuart N. Smith** has been appointed factory superintendent of the Buffalo plant of the Twin Coach Co. to succeed **Garfield Chalmers,** resigned. Mr. Smith formerly was in charge of final assembly. **Fred J. Kinney** has been named superintendent of parts control in Buffalo and **John H. Hartman** has been appointed superintendent of material control for the Buffalo and Kent, Ohio, plants.

• **E. J. Conlan** has been appointed a representative in the Cleveland area of the central district of Kennametal Inc., Latrobe, Pa. Mr. Conlan, who formerly served on Kennametal's staff of application engineers, will work out of the Cleveland office.

• **Frank M. Oglee** has been appointed central sales manager of the Trumbull Electric Mfg. Co. of Plainville, Conn. He has been manager of sales at the Norwood, Ohio, plant since last January.

• **C. M. Mohr** has been appointed new manager of the Freedom Div. of Freedom-Valvoline Oil Co., serving those sections of Pennsylvania, Ohio, and West Virginia known as the Tri-State area. For the past 3 yr he has devoted his time exclusively to sales-service work among dealers throughout the Freedom Div., and in his new capacity he will continue as much of that work as possible.

• **Fred A. Compton,** formerly purchasing agent, has been appointed sales manager of the Detroit Edison Co., Detroit. **Chester F. Ogden,** formerly assistant purchasing agent, has been appointed purchasing agent to succeed Mr. Compton.

• **John T. Foley** has been appointed sales representative in the western Pennsylvania and eastern Ohio territory of the Corbin Screw Div., the American Hardware Corp., New Britain, Conn. Since coming with Corbin Screw Div., he has been at the home office as a sales correspondent.

• **Harry E. Orr** has been appointed general manager of operations of the Bridgeville, Pa., and Niagara Falls, N. Y., plants of the Vanadium Corp. of America.

• **Arthur Tuckerman** has been appointed director of public relations for the American Car & Foundry Co., New York.

• **F. Rudolph Meyer** has been appointed St. Louis district sales manager of the Granite City Steel Co., succeeding Richard W. Orthwein, deceased. Mr. Meyer has been a sales representative with the company in its St. Louis office since 1943.

• **Henry B. Flinn,** for over 30 yr in the employ of The Fellows Gear Shaper Co., Springfield, Vt., has been made assistant publicity manager.

• **D. W. Balington,** assistant superintendent, Campbell, Ohio, blast furnace, has retired from Youngstown Sheet & Tube Co. after 40 yr of service. **Michael G. Morrison,** who began with the company 42 yr ago as a mailboy and who has been turn foreman in the bessemer department for 29 yr, will succeed Mr. Balington. **R. T. Evans,** general pipefitter foreman at Campbell plant, Youngstown Sheet & Tube Co., has retired after 44 yr. Mr. Evans joined Sheet & Tube as a pipefitter and was made pipefitter foreman a year later. **Carl. A. Stone** has been promoted to master mechanic at the South Chicago plant of Youngstown. He joined the company 19 yr ago. **Evan W. Jones,** foreman of the merchant mill for Youngstown at Youngstown, Ohio, retired recently after 40 yr of service.

• **Arthur P. Lothrop,** formerly plant engineer at the Leeds, Ala., plant of Universal Atlas Cement Co., has been appointed assistant plant manager.

• **Rollo E. Falk,** after 10 yr as vice-president in charge of manufacturing, and as a director of Revere Copper & Brass Inc., has resigned both of these posts, to open his own offices at 17 John St., New York, where he will specialize as consultant on operating problems in the nonferrous metal industry.

• **Dr. George C. Kuczynski** has been appointed to the research staff of the Sylvania Electric Metallurgical Laboratory at Bayside, N. Y. Dr. Kuczynski will do basic research work in studies of the electron theory of metals. Prior to joining the Sylvania Research Staff he was a special instructor in the application of quantum mechanics to the electron theory of metals at the Massachusetts Institute of Technology.

• **Bryce Gray** has joined the advertising department of the Pennsylvania Salt Mfg. Co., Philadelphia.

• **Dr. Courtnay Pitt** has been appointed economist of Philco Corp., Philadelphia, to be in charge of the division of economic research. Dr. Pitt joined the Philco Corp. in 1941.

• **Walt W. Winters** has been appointed to the post of manager of sales and advertising of Automatic Temperature Control Co., Philadelphia.

• **Robert Logie** has been elected treasurer and assistant secretary of The National Roll & Foundry Co., Avonmore, Pa. Mr. Logie will also serve as a board member. **Francis Nash,** formerly assistant secretary, has been elected secretary of the company, and **Harry J. Pittenger** has been appointed as superintendent.

• **C. H. Lenhart,** formerly assistant general superintendent, has been promoted to the position of general superintendent of Fontana, Calif. steel plant of Kaiser Co., Inc. **E. F. Donatic,** formerly assistant superintendent of general maintenance, has been promoted to the position of superintendent of general maintenance, succeeding **B. A. Shrive,** who has resigned.

FRANK B. LOUNSBERRY, whose appointment as technical director of Allegheny Ludlum Steel Corp. was announced in the Jan. 9 issue.

• **B. F. Bales** has become sales manager of the Shakeproof Div. of Illinois Tool Works after having served as assistant sales manager of the division. Mr. Bales will coordinate Shakeproof's sales, field engineering and advertising activities. **Russell H. Maude,** who has long been associated with the automotive phase of this business, becomes Detroit district sales manager. **John B. O'Connor,** formerly Detroit district sales manager, will take over the duties of chief engineer, and **Walter M. Hanneman** joins the Sems licensee division as chief engineer.

• **R. S. Kelly** has been appointed sales engineer for the Detroit territory by Michigan Bearing Co. Mr. Kelly has been employed as a construction engineer by the Detroit Edison Co. for the past 10 years.

• **James G. Morrison** has been appointed manager of the Detroit sales office of the National Tube Co., succeeding **L. W. Mason,** who was recently named manager of the company's Pittsburgh sales office.

• **Robert H. Winship,** superintendent of hulls, Bethlehem Steel Co., Quincy, Mass., yards, has retired following 30 odd years' service with the concern.

• **I. Guy Shapiro** has been elected vice-president of the Columbia Iron & Metal Co., Cleveland.

• **John C. Banser** of the law firm of Willkie, Owen, Otis, Farr & Gallagher has become associated with the Barium Steel Corp., New York, as general counsel.

• **John F. Gordon,** general manager of the Cadillac Motor Car Div.; **Ollie V. Badgley,** general manager of the Delco-Remy Div.; **Edward R. Godfrey,** general manager of the Frigidaire Div., and **Frederick G. Hughes,** general manager of the New Departure Div., have been elected vice-presidents of General Motors Corp., New York.

• **William C. House** has recently been elected to the office of vice-president in charge of manufacturing and engineering of the LYON - Raymond Corp., Greene, N. Y. Mr. House has been with the corporation for 20 yr.

• **Waldemar Naujoks** has recently resigned as chief engineer of the Steel Improvement & Forge Co., Cleveland, a position held for 12 yr. Mr. Naujoks is the author of numerous technical articles on forging techniques and co-author of "Forging Handbook" published by the American Society for Metals.

• **Robert W. Larson** has been appointed administrative assistant to the director of the General Electric Research Laboratory at Schenectady. In his new position Mr. Larson will aid Dr. Suits in planning, and later in operating, the new laboratories being built in nearby Niskayuna.

• **Dr. A. H. Tenney** has recently returned to the New York offices of Carbide & Carbon Chemicals Corp. as a technical representative for the fine chemicals division. He will specialize in the development of markets for new chemicals being developed by the research laboratories. Dr. Tenney has just completed 3½ years with the Manhattan Project at Oak Ridge, Tenn., and was previously associated with Carbide & Carbon Chemicals Corp. in a sales development capacity.

• **Ray L. Rex** has been appointed general superintendent of railroad service for the Air Reduction Sales Co., New York. Mr. Rex entered railroad service in 1919 with the Lehigh Valley. He will have his headquarters in New York and will report to Dr. G. V. Slottman, manager of technical sales division.

• **Thomas L. Hibbard** has been named the new director of styling for the Ford Motor Co., Dearborn, Mich. He will work with George W. Walker, Ford styling consultant on the design of the postwar Ford models. Mr. Hibbard has previously designed special bodies for Packard, White, Locomobile and other early motor cars. He was chief engineer for C. P. Kimball Co., Chicago custom body builders, and organized LeBaron. He also designed custom cars as a member of the firm of Hibbard & Darrin, which he organized. After a period as chief stylist with Cadillac, Mr. Hibbard joined Ford in 1940 to develop a six-wheeled armored car known as the GQ Model.

• **C. B. Follett** has been made regional sales manager of the farm equipment division of Ellinwood Industries, Los Angeles; **J. B. Van Der Werff** has been named chief engineer, electronics division; and **A. G. Willauer** has been selected as assistant project engineer in production of the firm's new engine.

• **Norman K. Van Derzee** has been named sales manager in charge of domestic sales of Hudson Motor Car Co. Mr. Van Derzee joined Hudson in 1932 in a merchandising and sales promotion capacity. He has served as regional manager, manager of the New York zone and eastern sales manager. During the war he headed Hudson's war contract division.

• **E. W. Brown** has been appointed director of distribution for the DeSoto Div. of Chrysler Corp., succeeding **J. L. Ballard.** Mr. Brown joined DeSoto in 1936 and became supervisor of planning in 1940. He has been connected with the scheduling in production of all DeSoto cars built at the present DeSoto plant.

• **E. H. Shepard,** research and development engineer on power and economy for Chevrolet Motor Div. of General Motors, recently retired.

HARRY E. LORENZ, purchasing agent, Carnegie-Illinois Steel Corp.

• **Harry E. Lorenz** has been appointed purchasing agent of Carnegie-Illinois Steel Corp., Pittsburgh. **C. H. Baringer** and **F. G. Buchheit** have been made assistant purchasing agents. Mr. Lorenz started his service with U. S. Steel Corp. subsidiaries in 1922 as a buyer in the Illinois Steel Co. At the time of the formation of Carnegie-Illinois Steel Corp., he was made office manager of the Chicago office. In 1944, he was made assistant purchasing agent of the Chicago district, the position he held until his present appointment. Mr. Baringer was first employed by Carnegie-Illinois in 1937 at the Canonsburg plant. In 1942, he was transferred to the purchasing department of the Pittsburgh office and in 1946 was made chief clerk, the position he held until his present appointment. Mr. Buchheit started his service with Carnegie-Illinois in January 1946, after 17 yr with the National Tube Co. as a buyer.

• **Guy P. Norton** has become affiliated with the Miles Metal Corp., New York, in the capacity of vice-president. Mr. Norton was formerly chief of the nonferrous scrap branch of the War Production Board and formerly director of the Material Division of the Surplus Property Administration, and later had a similar position with War Assets Administration.

No. 6. The Puzzle of the Counterfeit Coin

Here are 9 coins and a scale. Eight of the coins are of equal weight — the ninth is counterfeit, weighs less.

The problem: What's the least number of weighings necessary to isolate the counterfeit coin?*

Tricky, this one, but very apropos. For it's quite a trick today to solve some metal turning problems . . . to remove metal more quickly, more economically, in the least number of operations.

The chances are that turning accounts for 25 per cent or more of all machining time in your plant.

There are cases in our files of savings of hundreds of dollars a month in the manufacture of a single part by the use of Jones & Lamson machines. Our machines are designed specifically for the most efficient use of carbide tools which can remove metal 200 to 500 per cent faster. We have solved many tough cost problems. Solving them is our business.

Be skeptical of the production efficiency of all metal turning equipment in your plant.

Telephone or write for a Jones & Lamson engineer who will be glad to consult with you on all phases of your metal turning problems.

* The answer is 2.

JONES & LAMSON
MACHINE COMPANY
Springfield, Vermont, U.S.A.

Manufacturer of: Universal Turret Lathes • Fay Automatic Lathes • Automatic Double-End Milling and Centering Machines • Automatic Thread Grinders • Optical Comparators • Automatic Opening Threading Dies and Chasers • Ground Thread Flat Rolling Dies

• **Dr. William L. Hyden,** assistant director of cellophane research in Buffalo for the E. I. du Pont de Nemours & Co. Inc., has been named director of auxiliary sections of the technical division with headquarters in Wilmington, Del. He will be in charge of patents, personnel, development and planning for the division. **Dr. E. Spanagel,** research manager of the nylon section at Wilmington, will succeed Dr. Hyden in Buffalo.

• **Dr. Robert H. Aborn** has been appointed assistant director of the Research Laboratory, U. S. Steel Corp., at Kearny, N. J. Employed in the blast furnace department of Bethlehem Steel Co. in 1920, Dr. Aborn was employed at the Watertown Arsenal in 1923. He joined the Kearny laboratory of U. S. Steel in 1930.

• **William M. Hufnagel** has been appointed district sales manager of the new sales office of the Link-Belt Co. in Milwaukee. Mr. Hufnagel began his career with Link-Belt in 1924 at the Ewart plant in Indianapolis and in 1935 was transferred to the Dodge, Indianapolis, plant. In 1936 he was transferred to the positive drive sales department in Chicago and for a number of years has handled the Milwaukee territory from the company's Chicago plant. Mr. Hufnagel will be assisted in Milwaukee by **H. B. Johnson** and **F. E. Sweeney.**

• **Nevin F. Decker** has been promoted to the position of assistant factory manager of Hamilton Standard Propellers Div., United Aircraft Corp., East Hartford, Conn. In his new capacity, Mr. Decker will be directly responsible to the factory manager for all functions of the production engineering and manufacturing departments. Mr. Decker has been associated with Hamilton Standard Propellers since 1937, when he joined the division as a special assistant in the office of the factory manager. He headed the division's industrial engineering department during 1940 and 1941 and in 1942 he became assistant to the factory manager.

• **James H. Markley** has been appointed general manager of the newly equipped warehouse and plant of New York Steel & Rock Bit Corp., New York.

• **Charles H. Goddard,** assistant general sales manager of the lighting division, Sylvania Electric Products Inc., has been appointed general manager of the fluorescent fixture division. In his new position he will headquarter at the Ipswich, Mass. plant. Before joining Sylvania, Mr. Goddard was vice-president of the Pittsburgh Reflector Co., with which company he was associated for 14 yr.

• **W. P. Getty,** assistant to general manager of the raw materials department, has become assistant general manager of raw materials, of Jones & Laughlin Steel Corp., Pittsburgh. **M. E. Fry** becomes assistant to general manager of raw materials. Mr. Fry is also assistant to the president of the various raw materials subsidiary companies. **E. R. Cooper,** general superintendent, Vesta-Shannopin Coal Div., becomes manager of coal mines. **W. E. Hess,** assistant general superintendent, Vesta-Shannopin Coal, becomes general superintendent of coal mines. **H. K. Griffith,** assistant to general superintendent, Vesta-Shannopin, becomes assistant to manager of coal mines. **P. L. Tietjen,** marine manager, Interstate Steamship Co. and manager of Union Dock, becomes manager, Interstate Steamship Co. Union Dock is operated by Interstate Steamship Co., a J&L subsidiary.

W. P. GETTY, assistant general manager of raw materials, Jones & Laughlin Steel Corp.

• **J. E. Obernesser,** former general superintendent of the Milwaukee works of the International Harvester Co., has been appointed works manager at Milwaukee to succeed **Menno Felber,** who has been made works manager of the company's Maywood, Ill. plant. **William C. Brice** has been appointed general superintendent at Milwaukee and **L. E. Emley,** his assistant.

• **Donn Sutton** has been appointed public relations counselor for the Borg-Warner Corp. Mr. Sutton has served as editor-in-chief of the NEA Service, and during the war he was a war correspondent in Europe and the Mediterranean theatre. In his new capacity, Mr. Sutton will direct the news bureau for Borg-Warner in the corporation's executive offices at Chicago.

• **Harry P. Banks** has been elected vice-president and general manager of the western division of the Monsanto Chemical Co. Mr. Banks started to work in Seattle in 1909 with Falkenburg & Laucks. After serving several years as an engineer in Alaska and Southern California, he joined I. F. Laucks in 1918 and became president of that organization in 1944. With the acquisition of I. F. Laucks, Inc., by Monsanto in 1944, Mr. Banks became associated with the St. Louis firm.

• **Samuel Insull, Jr.,** has been appointed assistant to James S. Knowlson, chairman of the board and president of Stewart-Warner Corp., Chicago. Since his separation from the Navy in 1945, Mr. Insull has been vice-president of Central Barge Co., Chicago.

• **A. C. Fetzer,** vice-president, has been elected to the board of directors of Mack Mfg. Corp., Long Island City, N. Y. Mr. Fetzer, who was acting general sales manager, was at the same time appointed general sales manager.

• **Howard L. Steck** has been named comptroller of the Landis Machine Co., Waynesboro, Pa. **Leslie M. Hess** has been named assistant treasurer, and **Donald S. Fitz,** purchasing agent of the company.

• **Freeman X. Kinzie** has been appointed West Coast representative of the bearings and babbitt division of Joseph T. Ryerson & Son, Inc. He will specialize in the sale of Ryertex nonmetallic bearings and Glyco babbitt metals, making his headquarters at the company's Los Angeles plant. Mr. Kinzie, who has represented Ryerson in the Chicago and St. Louis areas for a number of years, succeeds **O. K. Graef** who has resigned.

• **Edward L. Keenan** has been elected vice-president and purchasing agent of United Engineers & Constructors Inc. of Philadelphia. He has been purchasing agent since 1928.

• **Paul R. Pollock** has been named manager of the Denver office of the Allis-Chalmers Mfg. Co. He has been associated with Allis-Chalmers since 1936, serving in the company's Washington and Denver offices. **Henry H. Roth,** whom Pollock succeeds at Denver, has been transferred to generator sales of the motor generator sales section of the electrical department at the company's main works in West Allis, Wis.

W. R. PERSONS, sales manager, Lincoln Electric Co.

• **W. R. Persons** has been made sales manager of the Lincoln Electric Co., Cleveland. Mr. Persons formerly was district manager at Pittsburgh, and later was recalled to Cleveland for a special postwar planning assignment.

• **Samuel L. H. Burk** has been appointed director of industrial relations for the Pittsburgh Plate Glass Co., Pittsburgh. He succeeds **Erson V. Ogg,** who has resigned to serve as a private engineering consultant.

• **S. B. Williams** has been appointed manager of customer relations for the lighting division of Sylvania Electric Products Inc., Ipswich, Mass. For the past 8 yr he has been editor of the *Electrical World.*

• **Louis S. Kimball,** general manager, fluorescent fixture division, Sylvania Electric Products Inc., has been elected vice-president in charge of operations of Colonial Radio Corp., which is a wholly-owned Sylvania Electric subsidiary. He will make his headquarters at the main office of Colonial in Buffalo.

• **William Mac Murtrie** has been appointed general purchasing agent of Philco Corp., Philadelphia. **Raymond A. Boyce,** former general purchasing agent and a member of the board of directors, has been promoted to director of purchases and will concentrate on overall planning and general administrative work on the staff level.

• **Harry G. Leighton,** who entered Brown & Sharpe Mfg. Co. in 1905 and who has had charge of the Philadelphia office, has retired from active service. **Thomas F. MacLaren** succeeds Mr. Leighton as manager.

...OBITUARY...

• **Roy R. Arnold,** division sales manager of the Michigan Smelting & Refining Div. and Aluminum Refiners Div. of Bohn Aluminum & Brass Corp., died Dec. 31. Since 1914 he was associated with the Michigan Smelting & Refining Co., which became a Division of Bohn in 1928, and assisted in the organization and development of the Aluminum Refiners Div. of the corporation.

• **Carl E. Kramer,** 64, one of the founders of United Screw & Bolt Corp. and senior vice-president in charge of Cleveland Div., died Dec. 22.

• **Guy Waldo,** 65, manager of the Whitmore Machine & Foundry Co., Menasha, Wis., and a vice-president of the First National Bank of River Falls, Wis., died Dec. 28.

• **S. E. Fairchild, Jr.,** 74, chairman of Cruse-Kempler Co., Ambler, Pa., died Dec. 31. He had been associated with the company since 1910.

• **E. L. Hollums,** 55, personnel director for Connors Steel Co., Birmingham, died Dec. 28 after several months' illness.

• **Mrs. William H. Stockham,** 83, chairman of the board, Stockham Pipe Fittings Co., Birmingham, died Dec. 31 following a short illness.

• **George K. Leet,** secretary of U. S. Steel Corp. from 1922 until his retirement May 6, 1941, died Jan. 7. He was formerly with the Dept. of Agriculture, the War Dept., and the Treasury Dept., and held the position of confidential assistant to the Assistant Secretary of the Treasury. In 1911 he entered the employ of U. S. Steel as secretary to the chairman and in 1922 was appointed secretary of the corporation.

• **Arvid Peterson,** chief engineer of the centrifugal pump and compressor department of the De Laval Steam Turbine Co., Trenton, N. J., for 20 years, died Dec. 19 after a short illness.

• **Richard W. Orthwein,** 45, St. Louis District sales manager for the Granite City Steel Co., died Dec. 20. Mr. Orthwein was associated with the Granite City Steel Co. for over 23 years. He represented the company in Memphis, Dallas and Kansas City before being transferred to St. Louis in 1937.

• **Willard S. Haring,** vice-president in charge of sales, Alan Wood Steel Co., Conshohocken, Pa., died Jan. 7. He became connected with Alan Wood in June, 1904, as a clerk in the order department. In 1930 he was appointed vice-president in charge of western sales and in 1937 was made vice-president in charge of sales.

Industrial News Summary...

- **Steel Strike Seen as Last Resort**
- **Both Sides Want to Avoid Shutdown**
- **Steel Ingot Rate Rises to 91.5 Pct**

STEEL management and steel labor both would like to avoid a major steel strike in February, but for different reasons. Steel officials see ahead the chance to keep operations at peak levels for many months and thus realize what they consider to be a reasonable profit on their investment. Steel labor on the other hand, while aggressively seeking a substantial wage increase, nevertheless would like to obtain this concession without resort to a national strike, the result of which might be far more stringent controls over labor unions than is now proposed by Congress.

Both sides are expected over the next month of negotiations to bend over backwards in order to reach a mutually satisfactory agreement. It is this state of affairs which has given rise to more than "hope" that there will be no nationwide steel strike this year. No such frame of mind on the part of management or labor was so strong a year ago when the mills were shut down and the country subsequently suffered a loss of 16 million tons of ingots because of the steel and coal strikes.

It is likely that the U. S. Steel Corp. early in the negotiations which begin early next week will make a moderate offer as a basis for bargaining. It is also likely that the initial concession offered by the company will be no more than a few cents an hour, whereas the union will probably counter with a much higher figure. The real bargaining will probably not get under way for several days or until both sides take each other's measure as to how far each is willing to go.

THERE seems little doubt that steel companies' arguments in the negotiations will revolve around high material costs, increased freight rates, higher unit wage costs and the extremely high breakeven point which the industry now faces. Some steel sources claim that the steel industry must operate at between 75 and 80 pct of capacity in order to make any profit at all.

Recent price increases are claimed by the industry to have been necessary to take care of accrued steelmaking costs exclusive of any new wage increases. Some independent observers, however, believe that the industry's price structure is now in such good shape that steel leaders are in a better bargaining position on the question of wage advances than they have been since before the war. It is safe to say, however, that any unusually high wage demand will be flatly rejected, since there is no disposition on the part of steel leaders to advance prices any more than has been done during the past 30 days.

Steel labor's position at the bargaining table has changed somewhat from a year ago. Living costs now appear to have passed their peak and the trend is expected to be downward for food and clothing over the balance of the year, even though the declines may or may not be significant. The elimination of the strike threat would assure steel workers a steady volume of work time as steel mills begin the task of cutting down delivery promises and whittling away at substantial backlogs.

This year's negotiations will contain an important secondary program involving guaranteed annual wage, change in overtime payments, expanded vacation plans and other social security demands. Failure to obtain even part of this program, however, would not be reason enough to call a strike.

THERE seems little doubt that the steel companies and the union will use up the next 30 days in negotiating and that the major initial wage arguments on the steel industry's part will be concentrated on offers under 10¢ an hr while those of the union will probably range around 20¢ an hr. The problem of both will be to determine how far each can give in without losing too much of their respective positions.

As a good send-off to the steel wage negotiations, the steel ingot rate this week is practically back at its postwar peak of 91.5 pct up one point from last week. Although scrap supplies continue tight and pig iron production is being pushed to the utmost, it is believed that steel operations barring a major shutdown will continue at current levels for some months to come.

Despite the substantial rise in steel prices complaints from consumers have been moderate. This was to be expected in view of the tremendous volume of demand compared with current supplies. When the latter begins to catch up with the former, veteran market observers see a severe testing of present steel quotations. Some steel officials believe that those which are based on a sound economical foundation will withstand a consumer testing while those which do not pass such a test will find a more realistic basis.

What happens to the present steel price structure at some subsequent time when demand may be falling off rapidly depends quite a bit on what wage advance is granted as the result of current negotiations. If this advance approximates 10¢ an hr it is a sure bet that no wide break in steel prices can be expected for some time to come, because the unit steelmaking costs would make such a condition economically unfeasible to any individual company.

• **STEEL WAGE RATE HITS NEW HIGH**—A new record in the average hourly wages paid to hourly, piecework or tonnage workers was established in November 1946, according to the American Iron & Steel Institute. The average hourly rate for November amounted to 136.7¢, topping the previous peak of 136.2¢, which had been set in September. The November 1946 rate compared with 134.1¢ in October and 122.0¢ in November 1945. The average number of employees during November climbed to the highest postwar level, totaling 600,000 workers, of whom 514,600 were hourly, piecework or tonnage employees. Reflecting the effects of the recent coal strike, the industry's wage earners worked only 38.0 hr per week on the average in November, representing a decline from October's level of 40.3 hr. As a result, total wages paid to all employees in November dropped to $143,440,700, as compared with October's $150,637,500. Through the first 11 months of 1946, the steel industry had paid its workers $1,406,925,500 in wages, despite the adverse influence of strikes. This compares with the $1,521,016,300 paid to employees during the similar period of 1945, when fewer strikes affected the industry's operations.

• **BARREL AND TOBACCO HOOPS UP**—Carnegie-Illinois Steel Corp., effective Jan. 3, announced a new price schedule on slack barrel hoop and on tobacco hogshead hoop. The prices, all f.o.b. Youngstown, reflect increases as much as $20 a ton on one slack barrel hoop size and increases of $12 a ton or better on the remainder of the sizes under this classification. On the tobacco hogshead hoop, the price increases amount to about 2½¢ per hoop.

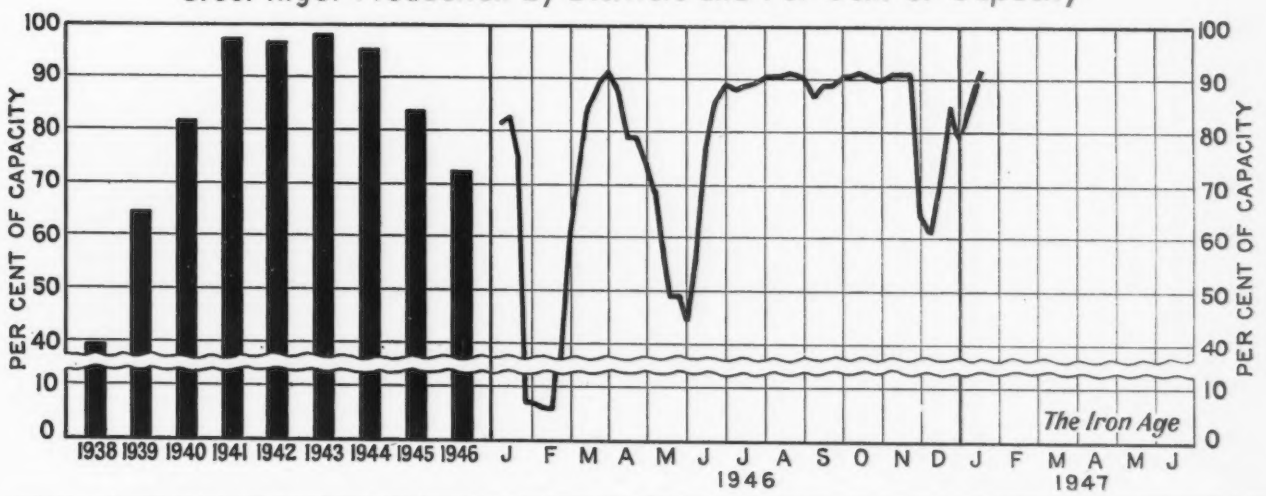
• **INDUSTRIAL BUILDING UP**—A 25 pct increase in private industrial building to bring the total for 1947 to approximately $2.1 billion is forecast by the Construction Div., Dept. of Commerce. Warehouses, office and loft buildings, stores, etc., will increase the total by another $1.8 billion. Overall new construction for the current year is estimated at $15 billion, 50 pct more than in 1946. About $11.7 billion will be represented in private construction, including about $6 billion for residential building, other than farm homes. Public construction is expected to drop by one-half in residential type to a total of $200 million; public industrial is expected to decline by a third to $60 million. In addition to the expected $15 billion in new construction, the Department forecast expenditure of nearly half as much, $7 billion, for repair and maintenance.

• **DECEMBER SURPLUS SALES HIGH**—A new high in surplus property disposal has been attained by WAA which reports the sale or leasing of $821 million worth (original cost) during the month of December. Actual sales amounted to $740 million (original cost) for which $246 million was received. Real property and war plant disposals jumped from $47 million in November to $220 in December; much of the increase, however, was caused by the sale of the $91 million Republic plant in Chicago and the $48 million Dow magnesium plant at Velasco, Tex.

• **STEEL OUTPUT DOWN IN 1946**—Despite the handicap imposed by three major strikes in 1946 the steel industry turned out 66,363,848 net tons of steel representing an average operating rate of 72.2 pct of capacity, according to the American Iron & Steel Institute. Although this is 17 pct below the 79,701,624 tons produced in 1945 when operations averaged 83.5 pct of capacity, it represents a higher peacetime output than for any year prior to 1940. December production of 5,700,997 tons, equivalent to 73.2 pct of capacity operations for that month, declined below the November output of 6,409,675 tons (revised) when operations averaged 84.8 pct. Production in both months was affected by the second coal strike during 1946. Fourth quarter, 1946, production of 19,020,269 tons, representing an 82.1 pct average operating rate, topped the 1945 fourth quarter output of 17,855,179 when operations averaged 74.2 pct of capacity. Of the 1946 output, 60,455,474 tons represented open-hearth steel, 3,327,815 tons comprised bessemer steel, and 2,580,559 tons was produced in electric furnaces. For 1945, the corresponding figures are 71,939,602 tons, 4,305,318 tons, and 3,456,704 tons.

• **GENEVA RATE CHANGE**—New freight rates have been established from Geneva to West Coast points according to the Transcontinental Freight Bureau of Chicago. The effective date for the new rates has not yet been announced. From Geneva to San Francisco, Santa Jose, Oakland, and Sacramento, the new rate will be 48¢ on a minimum of 80,000 lb via Denver Rio Grande Western and Western and Western Pacific Railroads. The same rates will apply to Portland, via Union Pacific or Rio Grande & Western, Western Pacific and Great Western, and also to Los Angeles and Los Angeles harbor points via Union Pacific. The former rate to all these points was 70¢. From Geneva to Seattle the new rate is 54¢ via Union Pacific, Rio Grande & Western, Western Pacific and Great Western. The old rate to this area was 76¢. Effective Dec. 31, the freight rate on plates and sheets from Geneva to Chicago and Milwaukee is $1.15.

Steel Ingot Production by Districts and Per Cent of Capacity



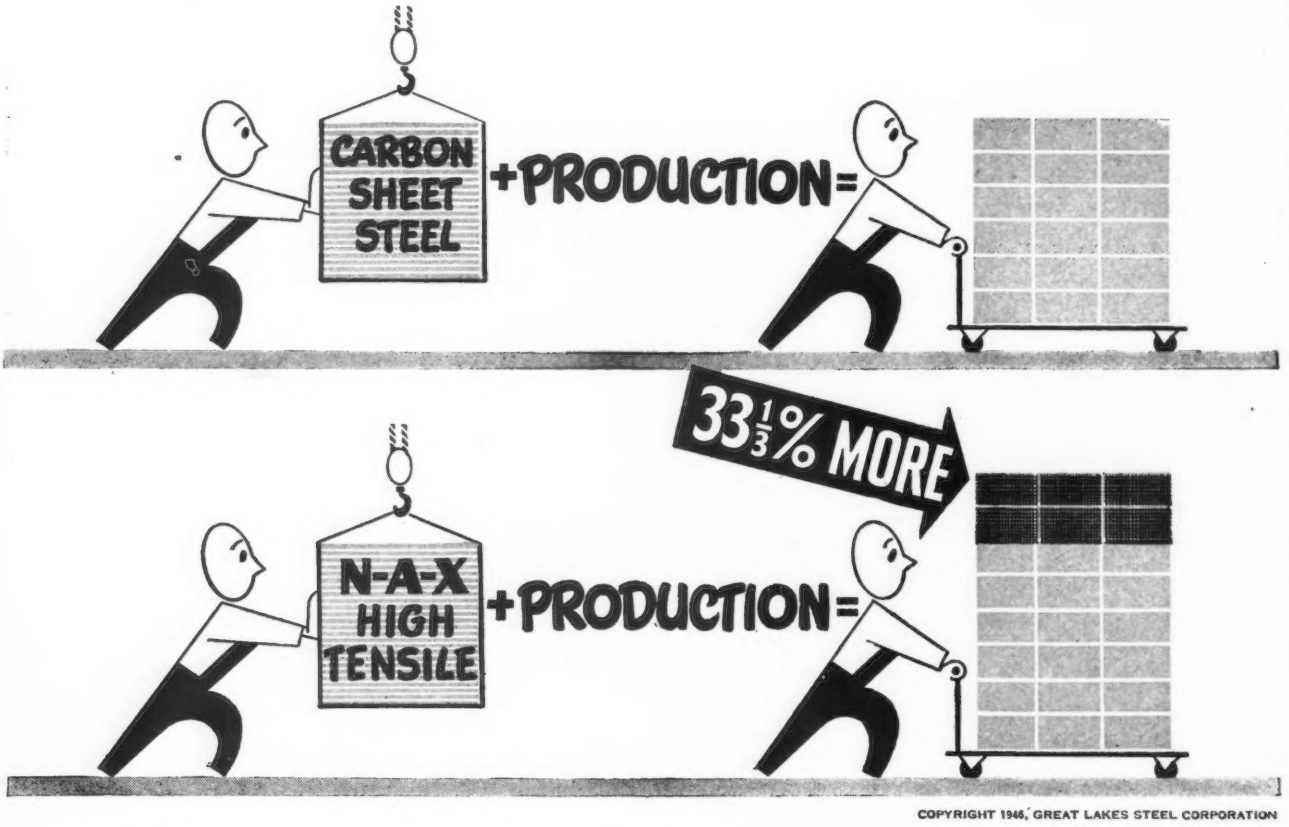
Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
January 7.....	100.0	90.5*	88.0	88.5	99.0	102.0	97.0	99.0	102.5	81.0	94.0	81.0	87.0	90.5
January 14.....	101.0	90.5	89.0	94.0	97.5	102.0	98.0	99.0	102.5	82.0	102.0	81.0	76.0	91.5

* Revised.

THE NEW ARITHMETIC IN STEEL

In production per ton—

1 ton N-A-X High-Tensile = 1⅓ tons Carbon Sheet Steel



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THE new arithmetic in steel is as simple, understandable—and as well worth remembering—as the multiplication tables.

N-A-X HIGH-TENSILE permits the use of lighter sections—as much as 25% lighter. Less steel is used per unit; more units are produced per ton. Yet finished products actually are stronger and more durable—thanks to the greater strength and toughness, the greater resistance to fatigue and corrosion, of N-A-X HIGH-TENSILE steel.

N-A-X HIGH-TENSILE also has excellent weldability, and can be cold-formed and deep-drawn to exceptional degrees for a high-strength steel.

The tremendous demand for N-A-X HIGH-TENSILE makes it impossible right now to promise normal delivery on new orders. However, our engineers will be glad to show you how to make the most of the new arithmetic in steel in figuring your plans for the future.

MAKE A TON OF SHEET STEEL GO FARTHER
Specify—
N-A-X
HIGH-TENSILE STEEL

GREAT LAKES STEEL CORPORATION
N-A-X ALLOY DIVISION • DETROIT 18, MICHIGAN
UNIT OF NATIONAL STEEL CORPORATION

Falling Off in Steel Demand Will Test Current Prices

New York

• • • **A falling off in** steel demand and a consequent easing of long-deferred deliveries later this year will severely test the currently high steel price structure, but efforts to crack it will fail if, as expected, steel wage rates are to be boosted again within the next month.

Some steel consumers claim that steel prices as a whole are too high, while steel producers point to increased steelmaking costs and a more realistic approach to extra charges as the basic reasons for higher quotations. So far surveys indicate that customers are so anxious to receive steel supplies that no loud outcry has as yet been made over the recent steel price advances.

Some steel officials believe that when the period of realistic testing of current quotations comes those advances which are predicated on a sound basis will stick, while others may be pared down as strong competition presents a sounder foundation.

The U. S. Steel Corp. sits down with the United Steelworkers of America at the bargaining table this week in one of the best positions it has assumed since the war began. The union, according to some observers, is more or less on the defensive in view of public reactions, possibility of lower living costs and the bad aftertaste following the filing of fantastic portal-to-portal law suits.

The steel company will claim that under governmental control steel prices were not allowed to advance enough to take care of increased wage and material costs. It will probably further argue, if such argument becomes necessary, that recent price increases represent a realistic approach to compensate for price advances not allowed but which steel companies claim were warranted under OPA controls.

There are some in the industry who believe that if 1947 steel operations can be maintained at between 85 and 90 pct of capacity, present quotations will allow the accumulation of at least part of

A Moderate Size Wage Boost Might Keep Price Structure From Cracking Open

o o o

By TOM CAMPBELL
News-Markets Editor

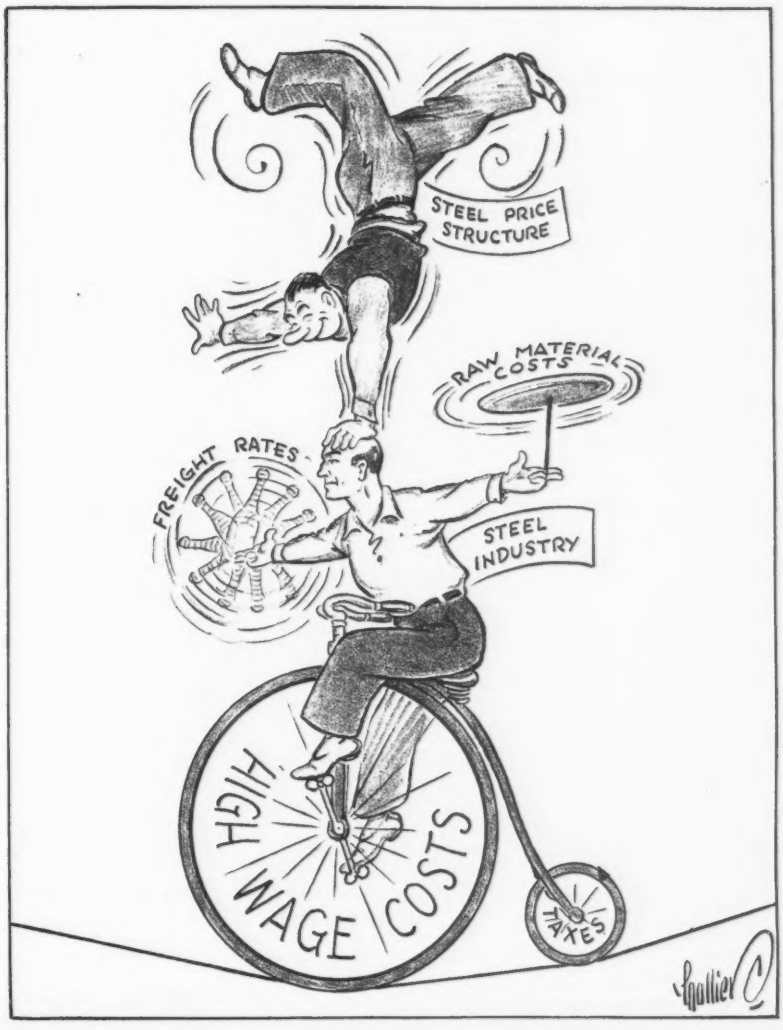
o o o

the sum necessary to offset as much as 10c an hr wage increase which the union may eventually obtain. Therefore, subsequent price advances necessary to absorb higher wage rates will not be as comprehensive as they would have been had price advances not been made during the past 30 days.

The higher the wage rates, some steel officials believe, the less chance there is for any industry-wide price battle such as that which occurred during the early part of 1938. On the other hand some steel leaders are privately worried about the inflationary effect of steel wage and price increases on the balance of the national economy. According to some reliable sources, very few if any steel leaders are pleased with the current steel price level.

The desire to maintain high operations during 1947 without in-

Aerial Artist



terruption and thus make a normal return upon investments is one of the major factors why it is safe to say that chances of a nationwide strike are less than 50-50. Only a stalemate such as occurred a year ago could result in such a serious decision on the part of the union leaders.

U. S. Steel will this week, as it has in the past, submit a moderate offer for a wage increase, but obviously the first offer will not be its last. The absence of the government in the current negotiations will return these meetings to a status similar to that which prevailed several years ago—a form of collective bargaining.

Philip Murray is as anxious to avoid a nationwide strike as is the steel industry, but inasmuch as a strike is the union's "ace in the hole" in attempting to get the best wage possible, the threat of such action will definitely hang over the conference table until negotiations have been completed.

A so-called social security program of the union and one which will constitute major demands upon the steel industry includes a guaranteed annual wage, better vacation plans, double time for holidays and specific portal-to-portal agreements. This is expected to be secondary to the wage demand. While the guaranteed annual wage will be definitely turned down by the company, the fact that U. S. Steel has been making a serious study of this phase of industrial relations over the past year will enable the industry to specifically answer such demands.

If the steel union agrees to the exact wording of the old WLB directive covering maintenance of membership, wherein there is a 15-day period when union members may withdraw from the union if they desire, little or no trouble is expected over the question of maintenance of membership with its union dues deductions from the pay envelope. Most of the larger steel companies while abhorring the principle involved will, at the bargaining table, probably go along without any change in the maintenance of membership clause, according to some reliable reports.

Despite higher steel prices with the possibility of even further adjustments to compensate for wage increases, it is the concensus in steel circles that the industry can only make a satisfactory financial showing at relatively high levels of operation. Furthermore, a drop below such levels will mean less take-home pay for workers, a sharp decline in steel profits and a temptation to take steel orders at lower than the going prices in order to keep expensive equipment occupied.

AMERICAN IRON AND STEEL INSTITUTE
CAPACITY, PRODUCTION AND SHIPMENTS

Period NOVEMBER - 1946

Steel Products	Number of companies	Items	Maximum Annual Potential Capacity Net Tons	Current Month: Production: Net Tons	Current Month: Production: Per cent of capacity	Current Month: Shipments (Net Tons): Total	Current Month: Shipments (Net Tons): To members of the industry for conversion into further finished products	To Date This Year: Production: Net Tons	To Date This Year: Production: Per cent of capacity	To Date This Year: Shipments (Net Tons): Total	To Date This Year: Shipments (Net Tons): To members of the industry for conversion into further finished products
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc.	41	1	xxxx	xxxx	xxx	307,902	144,120	xxxx	xxx	3,296,009	1,506,586
Structural shapes (heavy)	12	2	9,421,550	328,129	45.9	355,719	xxxx	3,143,963	38.8	3,170,367	xxxx
Steel piling	4	3		27,672		30,482	xxxx	204,479		189,022	xxxx
Plates (sheared and universal)	29	4	17,080,770	410,706	29.2	491,984	26,186	3,939,320	25.2	4,012,461	242,755
Skelp	6	5	xxxx	xxxx	xxx	51,762	24,502	xxxx	xxx	402,194	184,472
Rails—Standard (over 60 lbs.)	4	6	3,657,000	187,635	62.4	196,768	xxxx	1,660,996	49.6	1,632,661	xxxx
—All other	5	7	392,000	14,331	44.4	13,207	xxxx	131,456	36.6	133,560	xxxx
Splice bars and tie plates	13	8	1,745,960	59,229	41.2	63,170	xxxx	567,935	35.5	594,701	xxxx
Track spikes	11	9	349,400	13,036	45.3	13,401	xxxx	127,638	39.9	132,587	xxxx
Hot Rolled Bars—Carbon	34	10	xxxx	683,043	xxx	580,526	73,701	6,341,079	xxx	5,204,722	657,491
—Reinforcing—New billet	16	11	xxxx	91,079	xxx	102,112	xxxx	868,340	xxx	960,715	xxxx
—Rerolled	12	12	xxxx	16,676	xxx	15,435	xxxx	131,032	xxx	131,152	xxxx
—Alloy	24	13	xxxx	175,719	xxx	171,088	13,685	1,620,795	xxx	1,383,946	117,948
—TOTAL	41	14	22,326,160	966,517	52.6	869,161	87,386	8,961,246	43.9	7,680,535	775,439
Cold Finished Bars—Carbon	24	15	xxxx	133,073	xxx	130,123	xxxx	1,203,108	xxx	1,192,193	xxxx
—Alloy	23	16	xxxx	19,570	xxx	18,353	xxxx	200,776	xxx	180,157	xxxx
—TOTAL	31	17	2,851,510	152,643	65.1	148,476	xxx	1,403,884	53.8	1,372,350	xxxx
Tool steel bars	19	18	262,810	7,714	35.7	8,076	xxxx	91,472	38.0	88,455	xxxx
Pipe & Tubes—Butt weld	14	19	2,215,520	135,996	74.6	141,069	xxxx	1,287,363	63.5	1,214,850	xxxx
—Lap weld	9	20	730,200	32,825	54.6	35,263	xxxx	264,167	39.5	281,788	xxxx
—Electric weld	10	21	1,536,900	73,876	58.4	61,869	xxxx	715,306	50.9	612,889	xxxx
—Seamless	13	22	3,169,600	217,794	83.5	194,346	xxxx	2,019,749	69.6	1,776,640	xxxx
—Conduit (cap. & prod. incl. above)	6	23	xxxx	xxxx	xxx	10,630	xxxx	xxxx	xxx	90,917	xxxx
—Mech. tubing (cap. & prod. incl. above)	12	24	xxxx	xxxx	xxx	39,297	xxxx	xxxx	xxx	395,670	xxxx
Wire rods	26	25	7,293,670	436,315	72.7	89,876	27,116	4,053,313	60.7	942,643	320,693
Wire—Drawn	41	26	5,742,890	366,769	77.6	209,332	13,814	*3,232,610	61.5	*1,862,705	126,424
—Nails and staples	19	27	1,259,760	71,546	69.0	69,823	xxxx	563,737	48.9	562,062	xxxx
—Barbed and twisted	16	28	543,010	18,047	40.4	17,638	xxxx	190,707	38.4	187,931	xxxx
—Woven wire fence	16	29	1,121,060	32,986	35.8	35,230	xxxx	346,918	33.8	350,472	xxxx
—Bale ties	13	30	149,700	9,412	76.4	9,882	xxxx	86,159	62.9	90,383	xxxx
Black Plate—Ordinary	9	31	xxxx	xxxx	xxx	83,422	137	xxxx	xxx	692,235	1,463
—Chemically treated	8	32	465,000	10,793	28.2	10,622	xxxx	116,060	27.3	112,314	xxxx
Tin and Terne Plate—Hot dipped	9	33	3,758,850	154,421	49.9	167,515	xxxx	1,661,157	48.3	1,755,633	xxxx
—Electrolytic	9	34	2,231,850	75,961	41.4	80,478	xxxx	804,587	39.4	813,571	xxxx
Sheets—Hot rolled	31	35	19,785,320	1,407,042	86.4	681,926	39,927	12,669,025	70.0	5,769,742	382,439
—Cold rolled	14	36	7,309,460	564,155	93.8	438,849	xxxx	5,046,999	75.4	3,698,125	xxxx
—Galvanized	16	37	2,924,130	129,835	54.0	138,796	xxxx	1,289,146	48.2	1,333,283	xxxx
Strip—Hot rolled	25	38	7,180,030	258,395	43.7	164,877	21,326	2,271,233	34.6	1,447,846	218,586
—Cold rolled	34	39	3,067,450	137,263	54.4	131,811	xxxx	1,225,674	43.7	1,185,244	xxxx
Wheels (car, rolled steel)	5	40	315,400	25,432	98.0	26,083	xxxx	223,226	77.3	227,729	xxxx
Axles	6	41	398,170	13,722	41.9	15,054	xxxx	121,814	33.4	117,814	xxxx
All other	3	42	169,510	3,869	27.7	702	xxxx	40,451	26.1	5,781	xxxx
TOTAL STEEL PRODUCTS	143	43	xxxx	xxxx	xxx	5,404,498	384,514	xxxx	xxx	48,233,169	3,758,857
Effective steel finishing capacity	143	44	64,648,000	xxxx	xxx	xxxx	xxxx	xxxx	xxx	xxxx	xxxx
Percent of shipments to effective finishing capacity	143	45	xxxx	xxxx	xxx	94.4 %	xxxx	xxxx	xxx	75.5 %	xxxx

Washington Considers Ending Priorities and Allocations

Washington

• • • **Termination of all** priorities and allocations for iron and steel products, including housing needs, by the end of the current quarter is now under consideration by CPA and NHA. John C. Houston, Commissioner of Civilian Production, and Frank Creedon, Housing Expediter, told members of the CPA Steel Products Advisory Committee after their meeting on Jan. 10 that such a move would be considered in view of industry assurances that all urgent requirements could be met this year without resorting to rated orders and allocations.

Actually, CPA's priorities powers will expire on March 31, while NHA has indicated that it will be able to dispense with most allocations by the end of June. NHA could also exercise some of CPA's powers during this period.

The committee members were also presented with CPA estimates for 1947, which indicated steel output of 60,900,000 product tons, as compared with estimated demand of 66,900,000 tons. Industry representatives expressed the opinion that the CPA production figures were too high. CPA estimates export demand for the year at about 6,900,000 tons. Export shipments during 1946 totaled about 3,800,000 tons.

The committee also established a task committee to work with CPA's Steel Branch in channelling steel for domestic freight car production and urgently needed car repairs.

While the committee agreed to the continuation of the current Premium Payment Plan on nails, they rejected an NHA proposal to establish premium payments on galvanized steel sheets, carbon steel sheets, and an additional plan to cover freight charges for shipment to the Pacific Coast.

"Wildcat" offerings of steel at fancy prices were also causing the steel industry serious concern, the representative of one large company reported. He pointed out that irresponsible brokers were offering steel made by many leading producers. This condition, he said, indicated that some steel being produced on priorities was evidently being diverted from channels for which it was intended.

Industry Group Told CPA And NHA May End Controls on Iron and Steel

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By GENE HARDY
Washington Bureau

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The meeting was actually called for two main purposes: (1) to find ways of providing steel for freight car production and urgently needed repairs of existing equipment, and (2) to discuss the effectiveness of NHA's premium payment plans.

Committee members reported that in addition to the extremely heavy requirements of steel plate and sheets required for the car building program car wheels and axles were also in extremely short supply. The thought was expressed by one of the members that car wheels would probably prove to be the limiting factor. Most producers of specialty products required are now quoting deliveries in the second and third quarters of this year, according to industry reports.

New freight car output must be raised to at least 7000 cars monthly, as compared with Dec. 1946 output of 3120 cars and Nov. 1946 production of 3244, government officials said. ODT spokesmen claimed that output could be raised to 10,000 cars monthly but steel company representatives doubted whether industry could supply sufficient components to soon insure that rate of production. It was the consensus of the committee that the program would necessarily begin at lower levels and build up to an optimum of 7000 units.

While agreeing to the continuation of the nail subsidy until termination of the established program in March, committee members stated that they were generally opposed to premium payment plans under a free economy. They added that inasmuch as certain nail producers may have obligated themselves in recruiting labor and procuring additional equipment to increase output, it seemed equitable that these producers be protected by maintaining the plan in accordance with the original understanding.

NHA proposals for the establishment of additional premium payment plans were rejected on the grounds that they would only have the effect of "robbing Peter to pay Paul."

Industry representatives were: Paul Mackall, Bethlehem Steel Co., J. A. Henry, Weirton Steel Co., Adam J. Hazlett, Jones & Laughlin Steel Corp., Bennett S. Chappel, U. S. Steel Corp., Russell M. Allen, Allegheny-Ludlum Steel Corp., J. M. Schlendorf, Republic Steel Corp., W. W. Sebald, American Rolling Mill Co., and W. E. Watson, Youngstown Sheet and Tube Co.

New Steel Price Rise Confuses Consumers

Cleveland

• • • **Many a steel** consumer mustered his cost and purchasing departments last week in a concerted effort to bring order out of the cost chaos which followed in the wake of sweeping price increases by the steel industry.

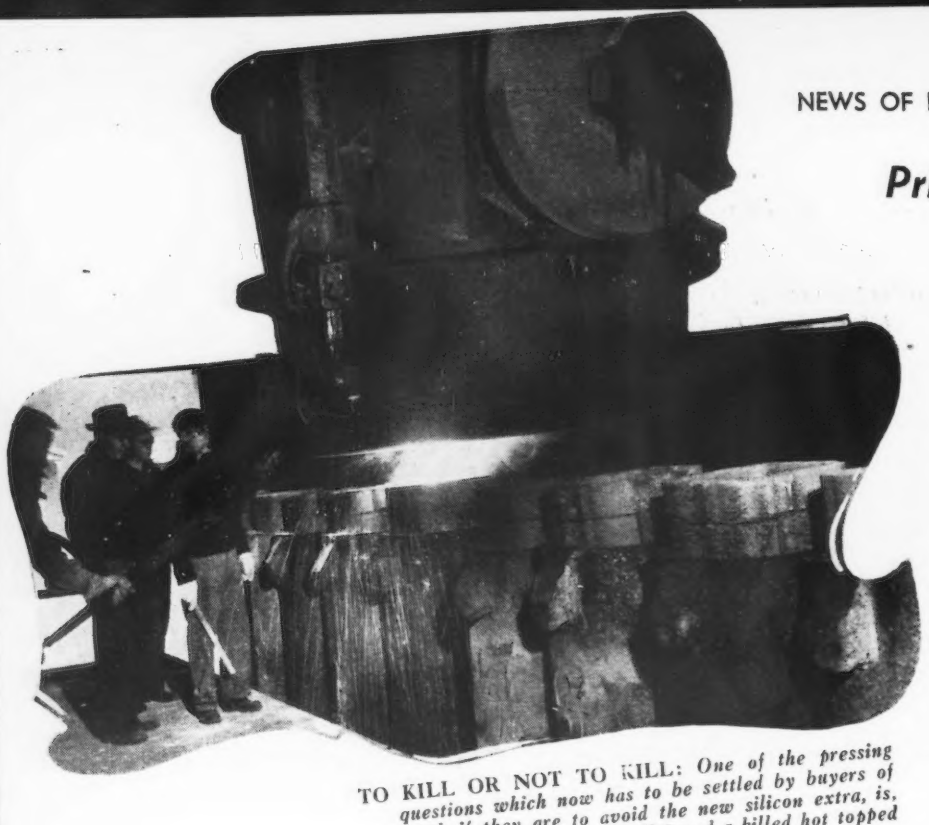
To many a fabricator, it seemed that the steel industry's top heavy setup on extras was a hang-over from OPA days, or confusion twice confounded. Others, hard pressed for shipments, accepted the new price structure without a squawk, hoping that the higher prices would discourage demand and result in quick improvement in the delivery situation.

On bars, the most baffling extras of them all are the quality extras and the chemical requirement extras, a section of the bar card where the suppliers still seem to be in disagreement. Among some of the consumers, there is no doubt that the minimum on these extras will cost $3 per ton and can easily go as high as $8 a ton. In any event, it is estimated that this quality increase extra will amount on the average to $5 a ton. Such increases will not apply to everyone, nor to every job, but many a bar consumer will be required to pay about $13 a ton for his product.

Price Extra Changes Seen

Some Customers Confused As They Study The Latest Rules

By D. I. BROWN
Chicago Regional Editor



TO KILL OR NOT TO KILL: *One of the pressing questions which now has to be settled by buyers of steel, if they are to avoid the new silicon extra, is, does the application actually need a killed hot topped ingot like those above.*

Chicago

• • • **The era of steel** salesmen being just "peddlers" and buyers merely passing out orders to match the requisitions is a thing of the past. From now on both parties will have to be engineers with the emphasis on metallurgy. The reason for the mandatory change in thinking and the need of a different approach to the entire steel market is the new price extras now in effect. Hereafter, consumer and salesmen will have to start talking prices and not just deliveries, lest the cost of finished items jump entirely out of line with past experience.

The chemical requirements and quality extras now in effect on hot rolled carbon bars are causing the entire trade a lot of headaches and represent the best single example of the effect of the recent price increases. Many consumers cannot understand why the old popular grade of C1019 killed carbon steel should suddenly carry a $9.00 a ton extra for chemical requirements alone, if the size is below a certain minimum section.

A consumer who actually needs the higher manganese content because the parts are heat treated or carburized can't dodge the issue by ordering the grade unkilled, as the assessments for restrictive requirements needed to do the job would cost $10.00 a ton in a nonkilled grade. It is also doubtful whether the mills would furnish such chemistry in rimmed, capped or semi-killed grades for metallurgical reasons. All in all, the act of buying and selling steel now demands the knowledge and judgment of experienced, well-informed metallurgists if the trade expects to be able to use the cheapest steel that will satisfactorily do the job.

Consumers, who have adopted the attitude that the mills are piling on unfair charges, cannot justifiably so contend when all the facts are presented. More reflection and explanation may be in order by the producers but it is held by the mills and expert unbiased metallurgists, that all the extras are warranted, and they can well prove their contention.

For example, the silicon extra, which is charged if the silicon content of over 0.10 max is specified, reflects the cost of production in fully killing a carbon grade and pouring hot topped ingots, which in cases may require big end up molds. The differences in the metallurgical requirements, melting practices, etc., in producing killed steels compared to semi-killed or open effervescent types are substantial, and the operating divisions which were consulted about the new price didn't miss a thing, including the holding time at the pouring platform for killed steel.

The wisdom of a clean break in the silicon extra at 0.28 carbon may be argued, but the line of demarcation had to be set somewhere, according to steel sources. From the rolling characteristics of the different carbon ranges in carbon steel, the breaking point is said to be well chosen. Any mill can produce conditioning cost records to show that the chipping and scarfing necessary to remove defects of certain grades is much higher below 0.30 carbon than above.

Metallurgists agree that as the carbon decreases, the extent of oxidation of the metal goes up and larger amounts of dioxidizers (such as silicon) are needed in lower carbon grades. They further amplify this with figures of lower residual manganese content and many other technical points bearing on the case. The consumer, according to steel sources, who blindly yells, "Well, don't kill it, I'll take it capped, open or semi-killed," never saw the sluggish rim action of a 0.20 carbon heat and the resulting thin skin ingots, which produce billets full of slivers and seams nor does he appreciate the importance of controlled grain size. Most consumers, steel metallurgists say, don't realize that the type of product they need to meet the requirements of the articles they make cannot be produced any other way at a profit to the mill, but they are going to learn, and fast.

Those consumers who disagree on the additional variable of size, claiming it should not affect the extent of the silicon extra, would need

Producing New Steel Sales Era . . .

a course in macroetching and internal soundness to be convinced. A break in size on an industrywide basis must be arbitrary and will, of necessity, disregard those who benefit and those who don't. The reason for this stand is obvious, as neither the producer nor the buyer would want the tonnage of particular size bars to be available only from certain mills.

However, from a metallurgical standpoint, it appears that an approximate size of 2½ to 3½ in. would be a fair unbiased decision. The exact size is still being argued among the various producers, but when it is set it will be on a sound metallurgical basis with the chips falling where they may. This feature will cause as many users to reconsider the exact size they need, as the manganese extra is causing consumers to change from C1019 to C1020 wherever possible. Another feature of the new extra cards is the leeway or cutting tolerances now in effect.

If a consumer wants to specify all random lengths, he will receive up to a 3 ft leeway on bars 3 in. and under, in 30 to 40 ft lengths and a leeway of 2 ft, in 5 to 30 ft lengths. This is not too far removed from former practice, but if the bar section is over 3 in., or of equivalent cross sectional area (weight per lineal ft), then he must accept a 4 ft cutting leeway, and run the chance of getting more scrap from his subsequent operations.

If the multiple lengths needed for the parts to be made are such that the 4 ft leeway is entirely out of question, the consumer must balance the resultant scrap loss against what he would have to pay for standard, special or precision cutting, and these extras are expensive. One criticism heard from the trade, which needs clarification, is that if a customer does not specify killed steels and the producer ships a killed grade, why must the buyer pay the higher price? —say consumers. This situation of a mill insisting on specifying what they think a customer must have has always been a source of irritation and has now become a matter of major importance.

Buyers of C1118 or the old grade, X1314, don't like the fact that, for round sizes ⅜ in. in diameter and under used for cold finished rods, they must now pay 50c extra instead of 25c. The alternative may be to use C1117, where a lower manganese range will bring down the price, but this cannot always be done.

Cold drawers are faced with the problem of ordering steel in such a manner that the hot rolled extras mesh with the extras on the new cold drawn price cards, and this not only requires intense study, but also a generous amount of clairvoyance. Cold drawers report that, in certain cases, the new cold drawn prices are not complementary with the hot rolled, and somebody had better clarify things. The nonstandard chemistry extras have jolted everyone, according to reports. Customers who carried odd grades have been changing back as fast as possible, and their former contentions that they had to have such chemistry have been forgotten.

Metallurgical divisions of the mills are now studying the price books in order to get prepared for the avalanche of questions and possibly a defense of their position. The old practice of increasing the cost of steel as the carbon content went up stemmed from tradition with no good fundamental reasoning or facts, say steel metallurgists. The industry is now on firmer, more tenable ground until normal demand returns and competition forces individual firms to retreat.

These examples and hundreds of others are causing a revolution in thinking and practice throughout the industry, not only in carbon bars but in all products. When the smoke clears away, there may be a little retreating from present positions by both buyers and sellers. Regardless, from a broad aspect, it is said the situation guarantees a better understanding on the part of all parties of the precise features of each others business, and therefore represents an important advance in the steel working industry.

Bill to Curb Portal Suits May Soon Be Up In House Committee

Washington

• • • **A comprehensive bill** designed to end the filing of portal-to-portal pay suits and drastically curb such action in the future has been introduced by Rep. John W. Gwynne (R-Iowa). It is expected to be taken up by the Judiciary Committee immediately.

An incomplete survey indicates that the amount now asked through such litigation may eventually reach the $5 billion mark.

"In view of the number of employees now subject to certain federal statutes," Mr. Gwynne declared, "the final amount may reach fantastic portions and do serious damage to our entire economic structure . . . The uncertainties, the protracted litigation will seriously retard production at a time when maximum production is sorely needed."

The proposed bill, which has strong backing, provides a statute of limitation of one year for the filing of suits for overtime; it also prohibits recovery for any period during which the employer was complying with the law as then interpreted or carrying out his part in accordance with any collective bargaining agreement in operation at the time.

These provisions are believed to outlaw most of the pending suits. The measure further provides that fresh suits, in those instances not barred by the measure, must be filed within 90 days.

It also provides that the burden of proof must be on the plaintiff and clearcut definitions of court jurisdiction are outlined.

This problem was considered last year when it was pointed out that many of such judgments, if rendered, would be charged against the government in instances such as cost-plus wartime contracts. A measure seeking to restrict probable actions of this type was introduced last year by Mr. Gwynne but failed of final enactment.

High Tensile-Low Alloy and Copper Bearing Steel Differential Set

Pittsburgh

• • • **Price increases** recently effected on high tensile-low alloy steels have established the desired differentials in base prices between these steels and straight carbon and copper bearing steels. The copper differential, in the meantime, has been set at 15¢ per cwt over carbon steel base prices across the board on all products. This differential was 10¢ a cwt on all but a few items, mainly the highly finished flat rolled products.

Thus, for the first time there is a definite relationship between the prices of carbon steels, copper bearing steels, and the high tensile-low alloy steels. This relationship is 1.45:1—or, high tensile-low alloy steel products have a base price 1.45 times greater than the base price of comparable copper bearing steel products.

In 1934, when high tensile-low alloy steels were first marketed, the spread between the prices of these steels and similar copper bearing items was not constant or consistent. The high tensile steels were priced high in relationship to other grades. By 1938, the prices had been trimmed somewhat, with the ratios varying from 1.45:1 on plates to 2.00:1 on hot rolled sheets and hot rolled strip.

The variations of the ratio of high tensile-low alloy steel base prices to the base price of copper bearing steels in the past have been wide. From 1934-1936 when these steels were first introduced, the ratio was the greatest, mainly because the product was new, its pricing was not yet established, and its acceptance on the market was not yet known. However, the base price of high tensile steels has not changed much, but the prices of other steels kept moving upward, thus cutting the ratio.

Many of these ratios continued to decline until during the past year they varied from 1.31:1 to 1.48:1. The new price increase, put into effect Jan. 7, has wiped out these spreads and established a definite ratio of 1.45:1 on all items except cold rolled sheets (1.42:1) and galvanized sheets (1.46:1). Thus, producers feel the prices are more in keeping with the prices of products of other types of steels. The accompanying table shows the ratios of high tensile-low alloy steel base prices to copper bearing steel base prices and how they have varied over the past 8 yr.

A Definite Relationship Now Exists Between Prices Of Various Type Steels

o o o

By T. E. LLOYD
Pittsburgh Regional Editor

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The present ratio of 1.45:1 in the price of high tensile to copper bearing steels has been established because of the 30 pct strength factor in favor of these high tensile steels. In other words, the physicals of the high tensile steels as compared with copper bearing steels are approximately 1.50:1. Thus, design can include a 30 pct reduction in the amount of steel used in a given contract by specifying the high tensile steels without sacrificing any physical strength characteristics.

Thus, producers point out, the charge of 30 pct over the copper bearing price represents only the saving of material in design. The other advantages of high tensile-low alloy steels represent savings to the consumer. Producers point out that these savings include the additional corrosion resistance of the metal, cutting maintenance costs; the lighter weight construction permitted, especially important in the transportation field; and the longer life, which not only reduces maintenance but cuts down depreciation costs of equipment. These are inherent advantages and add to the dollar savings of the consumer.

Further, many of the producers of high tensile-low alloy steels use the carbon steel extra schedule. This, in itself, is a reduction in cost to the consumer, they point out, since alloy extras are more extensive and in many cases higher.

The justifiable extras that include, primarily, processing of the products after hot rolling will be charged. These include extras for annealing, normalizing, heat treating, pickling, etc. However, there are many extras that are not appropriate to the high tensile-low alloy steels. These include all sorts of tests that are used for alloy steels such as magnaflux, porosity, etc. These extras do not apply to high tensile-low alloy steels, and the producers, generally, will not accept orders with such test requirements.

On the other hand, those producers that charge alloy extras may be expected to use such physical and chemical tests. The better physical and chemicals in high tensile-low alloy steels are inherent it is claimed in the steels and this service is a basic minimum in all such steels. Thus, some extras that are applicable to carbon products are not applicable to the high tensile-low alloy grades, producers claim.

Ratios of High Tensile-Low Alloy Steel Base Prices to the Base Prices of Copper Bearing Steel Products

Product	1938	Low	Current
Plates	1.45:1	1.32:1	1.45:1
Shapes	1.87:1	1.41:1	1.45:1
Bars	1.60:1	1.42:1	1.45:1
Bar Shapes	1.87:1	1.48:1	1.45:1
Hot Rolled Sheets	2.00:1	1.39:1	1.45:1
Cold Rolled Strip	2.00:1	1.44:1	1.45:1
Cold Rolled Sheets	1.72:1	1.32:1	1.42:1
Galvanized Sheets	1.58:1	1.31:1	1.46:1

Weekly Gallup Polls . . .

Public Faith in United Nations Found Growing

Princeton, N. J.

• • • **The United Nations** starts off the new year in a greatly changed atmosphere of public opinion in this country, according to George Gallup, director, American Institute of Public Opinion.

For the first time in 8 months of polling, the institute finds that more people are satisfied with the progress of the UN than are dissatisfied.

At one point, last July, a substantial majority of those expressing an opinion on the subject indicated dissatisfaction. Today, the weight of opinion is on the other side.

The change has taken place only within recent weeks, for as late as November the poll found the country still taking a dim view of the accomplishments of the UN.

The trend of sentiment is shown in the following polls:

"Are you satisfied or dissatisfied with the progress that the United Nations has made to date?"

	Satisfied Pct	Dissatisfied Pct	No opin. Pct
May 1946	37	37	26
July	26	49	25
November	27	43	30
Today	39	33	28

If the vote is confined just to those expressing an opinion, with the undecided eliminated, the trend would be as follows:

Vote of Those With Opinions

	Satisfied Pct	Dissatisfied Pct
May 1946	50	50
July	35	65
November	39	61
Today	54	46

The changed attitude is undoubtedly a reflection of the progress made during the final weeks of the UN session last month, when many problems that had hung fire were settled and when the Russian delegates showed a greater spirit of agreement and cooperation than had been the case before.

To a great extent the country's appraisal of how much progress the UN is making at any given time is conditioned by the behavior of the Russian delegates.

Dissatisfaction with the progress of the UN does not necessarily imply that those expressing it want to do away with the new world organization.

•

• • • **A more friendly** attitude is developing in this country toward Russia.

It is not a sweeping change. A substantial body of citizens still believe that Russia will not cooperate with us in world affairs. But as compared to the situation 9 months ago, or 3 months ago, there is a much more favorable ratio of sentiment concerning our relations with the Soviets. This may represent a response to more friendly Russian moves in the closing days of the United Nations meetings.

The latest study of public attitudes was conducted on the following question:

"Do you think Russia will cooperate with us in world affairs?"

The same question was asked in March, May and October of 1946. The trend follows:

	Yes Pct	No Pct	No Opin. Pct
March	35	52	13
May	45	38	17
October	32	53	15
Today	43	40	17

American attitudes toward Russia have varied sharply in the last 4 years. The pendulum has swung back and forth rapidly between friendliness and unfriendliness, depending on Russian actions.

Climbing slowly from 1942, confidence in Russia's willingness to cooperate with the United States rose to a high point in March 1945, when American and Russian armies were sweeping Europe.

Three months later there was a decline in the warmth of American feelings toward Russia. It coincided with Russian demands made during the United Nations Charter conference in San Francisco.

Then when Russia came into the war against Japan confidence in Moscow's intentions concerning us rose again.

In general, the group in America which shows greatest faith in

U. S. Attitude Toward Russia Friendlier Than 3 Months Ago; Public Wants Presidency Set

o o o

Russia's intentions are people who have had some college training. Those who have had only grade school education or no school seem the most suspicious of Russia.

The vote by education level follows:

	Yes Pct	No Pct	No Opin. Pct
College	60	33	7
High School	49	40	11
Grade or no school	35	42	23

•

• • • **A two-term limitation** on the presidency, which the Republican Party proposes to sponsor, meets with the approval of voters, although the majority is not large.

During Franklin D. Roosevelt's administration there was much talk about limiting the number of presidential terms to two. Sentiment always divided sharply along party lines. Today that is still true. The Republicans are found heavily in favor of the limitation, and a majority of Democrats are opposed.

The nation's attitude was tested by the institute in a coast-to-coast survey on the issue of limiting presidential tenancy to two consecutive terms.

"Would you favor adding a law to the Constitution to prevent any president of the United States in the future from serving more than two terms in a row?"

The vote:

	Pct
Yes, would limit	52
No, would not limit	40
No opinion	8

If the Republicans in Congress actually sponsor an amendment, as they promise, they will be carrying out one of the 1944 GOP platform planks. The 1944 presidential platform placed the party on record as favoring an amendment which would provide "that no person shall be president of

(CONTINUED ON PAGE 144)

AMERICAN IRON AND STEEL INSTITUTE

Production of Open Hearth, Bessemer and Electric Steel Ingots and Steel for Castings

YEAR 1946

Based on Reports by Companies which in 1945 made 97.6% of the Open Hearth, 100% of the Bessemer and 85.8% of the Electric Ingot and Steel for Castings Production

Period	Estimated Production—All Companies								Calculated weekly production, all companies (Net tons)	Number of weeks in month
	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL			
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January	3,528,090	51.1	207,512	47.4	136,452	29.2	3,872,054	49.6	874,053	4.43
February	1,300,944	20.9	25,905	6.6	65,668	15.6	1,392,517	19.8	348,129	4.00
March	5,946,698	86.2	363,949	83.1	196,400	42.0	6,507,047	83.3	1,468,859	4.43
1st Quarter	*10,775,732*	*53.8*	*597,366*	*47.0*	*398,520*	*29.4*	*11,771,618*	*51.9*	*915,367*	*12.86*
April	5,333,139	79.8	286,088	67.5	241,031	53.3	5,860,258	77.5	1,366,028	4.29
May	3,699,979	53.6	153,409	35.0	219,064	46.9	4,072,452	52.2	919,289	4.43
June	5,145,594	77.0	251,253	59.2	227,979	50.4	5,624,826	74.4	1,311,148	4.29
2nd Quarter	*14,178,712*	*69.9*	*690,750*	*53.7*	*688,074*	*50.1*	*15,557,536*	*67.9*	*1,195,814*	*13.01*
1st 6 months	*24,954,444*	*61.9*	*1,288,116*	*50.4*	*1,086,594*	*39.8*	*27,329,154*	*59.9*	*1,056,403*	*25.87*
July	6,016,253	87.4	365,332	83.6	228,083	48.9	6,609,668	84.9	1,495,400	4.42
August	6,251,271	90.6	373,837	85.4	261,755	56.0	6,886,863	88.2	1,554,597	4.43
September	5,911,375	88.6	371,465	87.8	235,054	52.1	6,517,894	86.4	1,522,872	4.28
3rd Quarter	*18,178,899*	*88.9*	*1,110,634*	*85.6*	*724,892*	*52.3*	*20,014,425*	*86.5*	*1,524,328*	*13.13*
9 months	*43,133,343*	*71.0*	*2,398,750*	*62.2*	*1,811,486*	*44.0*	*47,343,579*	*68.9*	*1,213,938*	*39.00*
October	6,268,102	90.8	387,933	88.6	253,562	54.3	6,909,597	88.5	1,559,728	4.43
* November	5,822,670	87.1	318,350	75.1	268,655	59.4	6,409,675	84.8	1,494,097	4.29
† December	5,231,359	76.0	222,782	51.0	246,856	52.9	5,700,997	73.2	1,289,818	4.42
† *4th Quarter*	*17,322,131*	*84.6*	*929,065*	*71.5*	*769,073*	*55.5*	*19,020,269*	*82.1*	*1,447,509*	*13.14*
† *2nd 6 months*	*35,501,030*	*86.7*	*2,039,699*	*78.5*	*1,493,965*	*53.9*	*39,034,694*	*84.3*	*1,485,904*	*26.27*
† Total	60,455,474	74.4	3,327,815	64.6	2,580,559	46.9	66,363,848	72.2	1,272,801	52.14

Note—The percentages of capacity operated are calculated on weekly capacities of 1,558,041 net tons open hearth, 98,849 net tons Bessemer and 105,491 net tons electric ingots and steel for castings, total 1,762,381 net tons; based on annual capacities as of January 1, 1946 as follows: Open hearth 81,236,250 net tons, Bessemer 5,154,000 net tons, Electric 5,500,290 net tons, total 91,890,540 net tons.

* Revised.
† Preliminary figures, subject to revision.

YEAR 1945

Based on Reports by Companies which in 1945 made 97.6% of the Open Hearth, 100% of the Bessemer and 85.8% of the Electric Ingot and Steel for Castings Production

Period	Estimated Production—All Companies								*Calculated weekly production, all companies (Net tons)	Number of weeks in month
	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL			
	*Net tons	*Percent of capacity	Net tons	Percent of capacity	*Net tons	*Percent of capacity	*Net tons	*Percent of capacity		
January	6,469,340	90.5	379,062	76.0	355,910	76.8	7,204,312	88.8	1,626,256	4.43
February	5,968,326	92.4	347,227	77.1	337,212	80.6	6,652,765	90.8	1,663,191	4.00
March	6,927,939	96.9	398,351	79.8	379,639	81.9	7,705,929	95.0	1,739,487	4.43
1st Quarter	*19,365,605*	*93.3*	*1,124,640*	*77.6*	*1,072,761*	*79.7*	*21,563,006*	*91.5*	*1,676,750*	*12.86*
April	6,541,627	94.5	372,952	77.2	375,308	83.6	7,289,887	92.8	1,699,274	4.29
May	6,664,117	93.2	402,100	80.6	383,450	82.7	7,449,667	91.8	1,681,640	4.43
June	6,129,763	88.5	379,807	78.6	330,952	73.7	6,840,522	87.1	1,594,527	4.29
2nd Quarter	*19,335,507*	*92.1*	*1,154,859*	*78.8*	*1,089,710*	*80.0*	*21,580,076*	*90.6*	*1,658,730*	*13.01*
1st 6 Months	*38,701,112*	*92.7*	*2,279,499*	*78.2*	*2,162,471*	*79.9*	*43,143,082*	*91.0*	*1,667,688*	*25.87*
July	6,318,975	88.6	381,832	76.7	284,764	61.6	6,985,571	86.3	1,580,446	4.42
August	5,172,344	72.3	347,088	69.5	215,885	46.6	5,735,317	70.7	1,294,654	4.43
September	5,435,799	78.7	352,847	73.2	193,829	43.3	5,982,475	76.3	1,397,775	4.28
3rd Quarter	*16,927,118*	*79.9*	*1,081,767*	*73.1*	*694,478*	*50.5*	*18,703,363*	*77.8*	*1,424,475*	*13.13*
9 months	*55,628,230*	*88.4*	*3,361,266*	*76.5*	*2,856,949*	*70.0*	*61,846,445*	*86.6*	*1,585,806*	*39.00*
October	5,146,787	72.0	242,122	48.5	207,867	44.8	5,596,776	69.0	1,263,381	4.43
November	5,641,308	81.5	358,664	74.2	200,494	44.7	6,200,466	78.9	1,445,330	4.29
December	5,523,277	77.4	343,266	68.9	191,394	41.4	6,057,937	74.8	1,370,574	4.42
4th Quarter	*16,311,372*	*76.9*	*944,052*	*63.8*	*599,755*	*43.6*	*17,855,179*	*74.2*	*1,358,842*	*13.14*
2nd 6 months	*33,238,490*	*78.4*	*2,025,819*	*68.5*	*1,294,233*	*47.1*	*36,558,542*	*76.0*	*1,391,646*	*26.27*
Total	71,939,602	85.5	4,305,318	73.3	3,456,704	63.4	79,701,624	83.5	1,528,608	52.14

Note—The percentages of capacity operated are calculated on weekly capacities of 1,614,338 net tons open hearth, 112,658 net tons Bessemer and 104,640 net tons electric ingots and steel for castings, total 1,831,636 net tons; based on annual capacities as of January 1, 1945 as follows: Open hearth 84,171,590 net tons, Bessemer 5,874,000 net tons, Electric 5,455,890 net tons, total 95,501,480 net tons.

*Revised January through December, 1945.

House Committee Reports on Economic Concentration

Details Ownership and Extent Of Market Coverage For Various Industries

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By GENE HARDY and KARL RANNELLS
Washington Bureau

o o o

Washington

• • • **In its study** of economic concentration in specific industries, the staff of the House Small Business Committee lists automobile manufacturing as the most highly concentrated. Iron and steel and their products were seventh on the list with nonferrous metals and their products taking eighth place.

The conclusions and recommendations of the report are covered fully on p. 78 of this issue.

Moves are already under way to continue the work of this committee and its Monopoly Subcommittee, which was responsible for the final report. Rep. Walter Ploeser (R., Mo.) has introduced a resolution which would continue the select Small Business Committee in the House. Indications are, however, that small business proponents will have a better chance of seeing this work continued in a subcommittee of the House Interstate and Foreign Commerce Committee.

President Truman, in his State of the Union Message, also gave his indirect approval to work of this nature when he listed monopolies and economic concentration as the nation's No. 2 economic problem, preceded only by labor-management difficulties.

The section of the report dealing with specific industries used four methods to measure concentration—(1) employment by establishments, (2) employment by firms, (3) output by the four largest manufacturers of a product, and (4) sales handled by large corporations.

The staff's complete list of major manufacturing industries, in the order of highest concentration, is as follows:

Automobiles, tobacco, rubber products, transportation equipment, electrical machinery, petroleum, coal products, iron and steel and their products, machinery other than electrical, chemicals, textile mill products, stone-clay-glass, food and related products, leather and its products, paper and allied products, furniture and finished lumber, printing and publishing, lumber and basic timber products, and, apparel and related finished products.

The trend toward domination or control of manufacture by a few large corporations has been growing over a long period, the committee reported. Only 25 pct of rolling mill capacity was owned by the four largest producers in 1880 as compared with 64 pct in 1938, the report stated; as to the automobile industry, the three leading producers in 1909 accounted for 42 pct of the output as compared with 90 pct in 1938.

For manufacturers as a whole, it added, firms employing less than 500 employees accounted for 51.7 pct of all manufacturing employment as late as 1939 but this proportion had dropped to 38.1 pct by 1944. It was the conclusion of the committee that postwar activities in connection with mergers and acquisition of additional facilities, including war plants, indicates continued movement toward concentration.

In respect to surplus plants and individual industries, the following is a condensation of the findings:

Surplus Plant Disposal: The report stated that should the 250 largest corporations acquire the government plants they operated during the war, then they would hold 65 pct of the nation's facilities which would then total almost as much as all facilities prior to the war. Most of these facilities, it was admitted, are scrambled and of little use to independent operators.

It was estimated that manufacturing facilities in 1939 were worth about $40 billion; an additional $26 billion worth were built during the war, two-thirds of which were federally financed. It was believed that about $20 billion worth of the facilities would be economically feasible for postwar operation.

However, WAA reported to the committee that through June 30, last, disposal has been made of only 488 out of about 1,500 plants. The original cost of the disposals totalled about $1 billion or 4 pct of the total. Furthermore, WAA said, only 65 of the 250 largest corporations had bought or leased plants (as of June 30, 1946); these included 18 which sold for more than $5 million and 15 which were knocked down for prices ranging from one-half to one million. Yet, it was estimated, acquisitions by the 65 firms accounted for about 70 pct of WAA plant sales.

Iron and Steel: Prior to the war, 18 integrated companies accounted for 85 pct of the finished hot-rolled products capacity, with United States Steel, Bethlehem and Republic producing nearly 60 pct of the steel ingots; through interrelationships with financial groups, by Jan. 1, 1945 three interest groups and one other represented 78 pct of the nation's aggregate capacity. These groups were listed as the Morgan-First National (United States Steel), Cleveland-Cliffs Iron (Republic, Youngstown Sheet & Tube, Inland, and Wheeling Steel), and Mellon (Jones & Laughlin, American Rolling Mill and Crucible Steel). The fourth group was Bethlehem. With four other large companies controlling an additional 7.5 pct, 86 pct of total ingot capacity was lodged within 13 producers.

During the war period, steelmaking capacity increased 17 pct with two-thirds accounted for by the three largest companies. Wartime gains are indicated to be enduring in view of the fact that increases in plant capacities, both private and government-financed, were "scrambled" and all government blast furnaces were adjacent to the steel plants. These cannot be feasibly separated from the plants.

Another wartime change affecting concentration was a huge increase in electric furnace capacity which boosted electric furnace capacity by 288 pct and alloy steel capacity by 800 pct; in 1945, Republic held 27.5 pct of electric furnace capacity, equivalent to all special steel requirements for 1940. In addition, eight integrated companies were responsible for nearly all the wartime increases in elec-

trolytic tinplate capacity; in 1938, these firms accounted for 84 pct of the total tin- and terneplate capacity and 97 pct of shipments in 1945.

Before the war, some 56 non-integrated or semi-integrated companies produced no pig iron but began operations with steel fabrication and about 150 concerns bought steel and began with the rolling process. During and since the war, a number of these firms began integrating their operations backward into the steel industry to assure themselves adequate supplies of steel. These were principally General Electric, Borg-Warner, Portsmouth Steel (new), Follansbee Steel, International Detrola, Barium Steel, Sharon Steel, and Taylor Forge & Pipe.

Tin can production, a large steel consumer, was held to be highly concentrated within about 100 concerns with American Can producing 55.4 pct and Continental Can 28.3 pct of total 1939 production with American buying largely from United States Steel.

Steel drums and barrels were mostly produced by 26 independent producers before the war; by 1946, through plant acquisition, seven basic steel firms (United States Steel, Bethlehem, J&L, Inland, Wheeling, Republic, and Granite City) controlled 87 pct of capacity with the remainder divided between 10 independents.

Nonferrous Metals: The copper industry is dominated by four companies, and the copper and brass fabrication is handled mostly through their subsidiaries. Mining is controlled largely by Kennecott Copper, Phelps Dodge, and Anaconda Copper while fabrication is mostly done by American Brass, Chase Co., Phelps Dodge Copper Products, Anaconda Wire & Cable, Kennecott Wire & Cable, together with American Smelting & Refining which holds a large interest in Revere Copper & Brass.

In 1890, the four largest producers mined 76 pct of the total copper but this had been reduced to 39 pct by 1920; at the peak of war production, the leading four produced 85 pct.

St. Joseph Lead was listed as producing 40 pct of the lead in 1944 with Federal Mining & Smelting, Bunker Hill & Sullivan, and Eagle Picher Lead accounting for about 5 pct each. New Jersey Zinc is the largest zinc producer, occupying a position similar to that of St. Joseph in the lead industry. Eagle Picher accounts for about 13 pct while others, including Federal Mining, produce up to 5 pct each.

Through disposal of government surplus plants, the Aluminum Company of America, which once controlled 95 pct of aluminum, now has only about 44 pct of the total facilities. Two newcomers have entered the field. Reynolds Metals Co., now controls 36 pct of alumina, 28 pct of primary aluminum, and 29 pct of rolling mill capacity; Henry J. Kaiser will operate 20 pct of the alumina, 13 pct primary aluminum and 18 pct rolling mill capacity. However, while Alcoa's proportion declines, the company owns practically all the high-grade domestic bauxite, and its own ocean shipping facilities.

Dow Chemical Co., sole producer of magnesium before the war, is still dominant in that field. The patents covering use of magnesium in alloys have been controlled by I. G. Farben and Alcoa.

Automobiles: Prior to the war, General Motors, Chrysler and Ford were producing 90 pct of the passenger cars with the remainder divided among eight other firms; automobile financing was carried on to a large extent through companies affiliated with manufacturers. Growth of the three leaders to a position of dominance was attributed largely to mergers and acquisitions.

BRAINS AND BEAUTY: *Phyllis Barrow at the calculator controls of the world's largest mechanical calculating machine recently unveiled at Harvard University before a group of 200 army, navy and civilian experts.*

Rubber Products: More than 92 pct of the assets and sales of the industry are concentrated within Goodyear, Firestone, U. S. Rubber and Goodrich. Their advantageous position is attributed partially to their distribution outlets: Sears, Roebuck (Goodyear), Standard Oil and Montgomery Ward (United States and Goodrich), and Western Auto Supply Co. (Goodyear and United States Rubber). Goodyear, Firestone and United States Rubber own their own rubber plantations.

Transportation Equipment: Four companies produced 86 pct of locomotives in 1945; four firms produced 50 pct of railroad cars; four companies produced 35 pct of wartime aircraft; and five contractors received 23 pct of the shipbuilding contracts.

Petroleum: The industry is dominated by 20 major firms, integrated so as to cover all major activities from production of crude to retail distribution; they own 30 pct of producing wells which represent 50 pct of crude output and own 85 pct of cracking capacity. Owned jointly by Standard of N. J. and Du Pont (General Motors), the Ethyl Gasoline Corp. exercises a special type of control, virtually policing the market. The committee believes use of the Big and Little Inch pipelines could be used for the independents to break the monopoly of the majors.

Machinery (other than electrical): Although concentration in agricultural machinery declined somewhat over a quarter-century, in 1945 the four largest operators produced 40 pct of all agricultural machinery while four producers shipped 84 pct of farm tractors. Closely allied to this group is that manufacturing construction machinery which tended to become less concentrated during the war. However, the four largest firms in this field produced 19 pct in the first quarter 1945 and the four next largest, 10 pct. Up to 85 pct of various types of food processing machinery production lies in one company.

Bearings: More than 50 pct of ball bearings are produced by a division of General Motors. The European firm, SKF, produces 11 pct; Fafnir Bearing Co., Marlin-Rockwell, and Hyatt division of General Motors each produce 10 pct with the remainder divided between 20-odd firms.

Scrap Market Conditions Concern Barringer and Tower

New York

• • • **"We look with concern** upon some of the recent manifestations in the scrap market," Edwin C. Barringer, executive secretary and retiring president, Institute of Scrap Iron & Steel, said in addressing the institute's 19th annual convention in New York on Jan. 7. Some of its behavior, he declared, may be due to the end of OPA controls, some to direct sales which upset the balance of the industry and others to entrepreneurs making tie-in sales. Dissatisfaction with present scrap conditions was also voiced by Walter S. Tower, president, American Iron & Steel Institute, who called for prompt correction of wartime distortions in the industry.

All this will pass, Mr. Barringer believes, for 60 days is too short a time to expect stability after 6½ years of artificial suppression of the normal laws of trading. Pointing up the industry as a factor for conservation of our natural resources, the institute's retiring president reminded his listeners that every ton of scrap saved about 4 tons of ore, coal and other materials.

Branding the failure of the government to return available battle scrap from overseas as a "colossal blunder," the institute spokesman criticized rejection of the 1945 European mission's report recommending return of this material and subsequent reversal of its stand late in 1946. (See THE IRON AGE, Jan. 2, 1947, p. 137.)

The institute is now in a position to formulate a program for the betterment of the industry, including emphasis on public relations, bettering appearance of the yards, improvement in accounting methods and modernization of specifications on iron and steel scrap.

The scrap industry is among the ten top in the country in annual dollar volume and as such commands respect, Mr. Barringer stated. "The best public relations job we can do at this time is cement our standing with our public—the steel mills and foundries."

Cross Hauling, Tie-In Sales Criticized at New York Scrap Convention

Referring to increased attention to costing, he asserted that the young men of the industry are a guarantee that "slipshod methods of computing costs are vanishing, and that blind and unintelligent competition will no longer plague the dealer who has modernized his methods."

The institute has requested the Dept. of Commerce to call a conference shortly of dealers, consumers and producers of scrap in order to bring specifications up to date. Another factor upon which the institute is working is a campaign to reduce insurance costs and improve personnel practices.

The present position of scrap is far from satisfactory to the steel producers, Walter S. Tower told the convention. Abnormal scrap movements, increased ingot capacity and the demand "for every pound of scrap that can be pried loose" are primarily responsible for the present state of scrap supply, the American Iron & Steel Institute head declared. Admitting that the producers had to take scrap from sources not logical under ordinary circumstances, he also reminded the scrap men that mills had to deplete stocks beyond accepted safety margins. He also stated that it was alleged that producers have had to accept improperly graded shipments.

"Such conditions need to be corrected as rapidly and as completely as possible in order to restore the sound basis of relations which existed between suppliers and consumers in the period prior to 1940," he asserted. Mr. Tower voiced the hope that increasing supply would correct the unfavorable conditions of the scrap market. Declining to say whether he thought present prices too high, the steel institute head did say that he hoped it would not take a sharp business recession with its consequent decline in demand for scrap to correct present conditions.

On January 6, the convention's opening day, the broker's committee discussed direct dealing and tie-in sales. Stanley Kaplan, committee chairman, branding these practices as evil, laid them to a breakdown in the services rendered. Producers and consumers of scrap are responsible for direct dealing, he asserted.

Conceding the existence of tie-in sales, two steel industry spokesmen said that their companies had refused to engage in tie-in sales where buyers of their product had offered to sell scrap at any price. Raiding of competitors' territories for scrap also came in for criticism.

Citing the relative lack of cost accounting in the scrap industry compared to others, Calvin Lieberman, Kasle Iron & Metals Co., Toledo, stated that from now on it's going to be a matter of the survival of the fittest, and if cost accounting is generally adopted in the industry some wild bidding will disappear.

Mr. Lieberman pointed out that management must have cost figures at frequent intervals in order to base intelligent decisions on them. He presented a series of cost tables, which might be modified for adaption to dealer operations, designed to apportion direct and indirect expenses of each piece of equipment, labor and overhead to the three major prod-

New Scrap Officers

New York

• • • **Philip W. Frieder, Cleveland, was elected president of the Institute of Scrap Iron & Steel at its annual convention here last week. He succeeds Edwin C. Barringer in this post, while Mr. Barringer retains his position as executive secretary. E. L. Solomon, Pittsburgh, and Marvin Plant, Baltimore, were elected first and second vice presidents, respectively. Stanley Kaplan, Chicago, becomes secretary and S. Kewell, Detroit, treasurer. Thomas F. Kelly was reelected comptroller.**

ucts, bales, mixed iron and metals.

Annual scrap consumption of 72 million tons was forecast by Elmer W. Pehrson of the U. S. Bureau of Mines based on estimated demand of 197 million ingot tons of steel in 1970. The Bureau of Mines forecast of steel and scrap consumption was based on an estimated increase of 25 pct in per capita use of steel by 1970, which in 1929 was 0.48 tons per year, coupled with a population increase to 156.5 million in 1970. On this basis, Pehrson estimated that openhearths would consume 55 million tons of scrap, blast furnaces, 5 million tons, and foundries, 12 million tons.

French and Luxemburg Steel Men Agitating For New Steel Cartel

London

• • • **As predicted in** THE IRON AGE, (May 23, 1946 p. 82) French and Luxemburg steel sources are beginning to agitate for the reorganization of the international steel cartel. Press reports in Paris indicate that the discussions held in London recently on the establishment of an international trade organization emphasized the need for some type of international agreements.

There is also a call here for some allocations of European markets between France and Great Britain as French sources fear that due to the loss of markets in other parts of the world the British Iron & Steel Federation will drive hard for expanded European markets.

Bringing up the issue for general discussion the Luxemburg journal *Echo de l'Industrie* makes the following points:

1. It will be necessary to eliminate the prejudice which exists in some parts of the world particularly the United States against such agreements.

2. Despite the assumption in the United States that all cartels are evil the prewar steel group did the following things:

(a) Stabilized prices, employment, and production.

(b) Prevented ruinous competition without acquiring a monoply.

(c) Improved the quality of products and collaborated with consumers.

(d) Adjusted production to demand and avoid unhealthy extension of productive capacity.

Due to the specialized position of the steel industry in the Luxemburg economy, the prewar cartel probably found its strongest support in this country, and the central organization operated from there with governmental cooperation.

The Luxemburgian paper went on to point out that when the agreement could be renewed it would need to be subject to government control, which would respect the rights of members while at the same time protect the consumers. The discussions among the international trade group were said to favor the registration of cartels by governments and periodical reports on their activities to be made to control committees. National laws would presumably be required to prevent abuses by the new organizations.

Despite the efforts which have been made by the U. S. State Dept. to break up cartels in Europe, the countries involved still feel strongly that whether they be drawn up by private citizens or by corporations or governments they must exist. The opinion is frequently stated here that at some point the American Government must be willing to compromise its position on this subject, and accept the Continental viewpoint in some form.

No guesses have yet been made as to exactly when a formal cartel agreement might be worked out. As long as the seller's market exists, there is no specific need for it, other than an underlying feeling that the competitive groups might be better able to come to a formal agreement when competition is less keen. There are certainly no signs of the sellers' market disappearing as yet, and until the vast accumulated demand is absorbed, a formal agreement considered by most sources to be unlikely.

Coming Events

Jan. 23-24 **Society of the Plastics Industry,** technical session, Chicago.
Jan. 27-29 **Industrial Diamond Assn. of America, Inc.,** annual convention, Atlantic City, N. J.
Jan. 27-31 **Electrical Engineering Exposition,** New York.
Jan. 27-31 **International Heating and Ventilating Exposition,** Cleveland.
Jan. 28-Feb. 2 **Society of Plastics Engineers,** exhibition, Chicago.
Feb. 17 **Chicago World Trade Conference,** Chicago.
Mar. 17 **American Institute of Mining & Metallurgical Engineers,** world conference on mineral resources, New York.
Mar. 17-19 **American Society of Lubrication Engineers,** annual meeting, Pittsburgh.
Mar. 17-19 **American Gas Assn.,** sales conference, Boston.
Mar. 19-22 **American Society of Tool Engineers,** annual meeting, Houston.
Mar. 22 **Western Metal Conference and Exposition,** American Society for Metals, Oakland, Calif.
Mar. 31-Apr. 2 **Midwest Power Conference,** Chicago.
Apr. 7-10 **National Assn. of Corrosion Engineers,** convention, Chicago.
Apr. 8-11 **American Management Assn.,** packaging exposition, Philadelphia.
Apr. 29-May 1 **Industrial Packaging and Materials Handling Exposition.** Industrial Packaging Engineers Assn. of America, Chicago.
May 15-17 **Society for Experimental Stress Analysis,** annual meeting, Chicago.

Offers Surplus Hand Tools

Washington

• • • **A $7 million** inventory of government surplus hand tools is offered wholesalers, exporters and large and small retailers at a fixed price sale which began Jan. 15 and will run until Feb. 10.

This represents the entire WAA inventory of new hand tools. Included among the general types of items offered are:

Wrenches including box, socket, open end and speed types; chisels, hammers, mallets, calipers, files, pliers, screwdrivers of various types, soldering irons, gages, etc.

Catalogs may be obtained from San Antonio, Boston, New York, Chicago, San Francisco, and Los Angeles regional WAA offices.

The London ECONOMIST

How to Cook an Election

Reprinted by special permission to further understanding on how political and economic affairs are viewed in London.

° ° °

POLITICAL elections can be simply held; they can also be made, rigged or cooked. It is, perhaps, the analogy of cookery which most clearly brings out the difference between elections which are properly organized and those which lack the hand of the skilled manipulator.

It is not enough, as many an amateur cook discovers to his cost, to assemble the ingredients of a Christmas cake and put them in the basin; the result may well be a shapeless mess or a pile of smoking cinders. The skilled cook leaves nothing to chance; he means to produce a Christmas cake, he has his plan for making it, and he directs and controls the process throughout.

Similarly, the proper object of a democratic parliamentary election is to manifest the support of the sovereign people for the ruling party, and election cookery is the art of making sure of it. In politically backward countries, such as those of the Anglo-Saxons, it must be admitted that the art remains in a very undeveloped state; it is true that some very good cooking recipes have been invented in these countries—Professor Brogan has collected some of the best—but the factious and undisciplined character of the race and the strange willingness of its political leaders to be electorally defeated have so far prevented their general adoption.

Happily, there is now no lack of examples of a superior way of political life; notable exploits of election cookery are of such frequent occurrence in this postwar world that there is really no excuse for the out-of-date confusion and uncertainty of our own system and it is to be hoped that some lessons will be duly learned from the next cookery exhibition to be featured in the world's news.

The Anglo-Saxon addition to unorganized elections may be attributed largely to the traditional love of sport. Undoubtedly, there is a certain excitement in not knowing who is going to win, and from the gambler's point of view, competing parties in a general election are just as good for betting on as race horses or dogs.

The election prophets are confounded almost as often as the favorite fails to win the Derby, and party backers sometimes hold victory lunches, only to hear of catastrophic defeat during the second course. The government of the day does not know for certain whether it is going to be returned or not; no Minister can say with confidence that his office is his castle, for tomorrow he may be cast out of it by the ungrateful populace. In this mutability of political fortune the vulgar rabble takes a malicious satisfaction and the destiny of an ideology is made the subject for a sweepstake.

IN countries where politics are taken seriously, however, such a frivolous attitude cannot but be condemned. How is the citizen to have a proper sentiment of reverence for government authority and an adequate resignation to the sufferings which great statesmanship imposes, if he can dismiss a Minister overnight? A Minister may, of course, be dismissed and even put to death at the will of the party, but that does not shake the power of the state; it only renders it more awesome.

What is intolerable is that men in high office, and even the ruling party itself, should be deprived of power and place just because the sovereign people had been influenced and misled by the enemies of the state. But one cannot in such a case blame the people; it is the duty of the rulers to preserve the people from contamination and to maintain their own power, which is for the people's good.

If politicians are ready to allow unregulated elections and to give up power merely because the vote goes against them, it shows that they lack confidence in themselves or else that they are in politics for unworthy and frivolous ends. If a man is not certain that he and his party are exclusively right in what they are doing, he is obviously not a man of principle, and if he is certain, then how can be bear to quit office and have his work interrupted?

A high and serious view of politics clearly requires that the holders of power should go on holding it; to let go would be a betrayal of their cause, whatever it is. There is no sense in striving to gain power and then pusillanimously giving it up, when acquired, w i t h o u t even killing anybody.

WHY then, it may be asked, have elections at all. Would it not be safer to omit consulting the sovereign people? After all, history swarms with rulers who never bothered about being elected.

But such a line of argument would be mere escapism. The days of despotism are gone forever; there is no longer either divine right or hereditary right; nobody doubts that the will of the people is rightfully supreme. The problem is to insure that the people have the right will, and there must be no shrinking from this issue. There must be no dishonest evasion of it by failing to summon parliaments or by limiting the franchise or by restricting parliamentary control over the executive.

The whole people must be given the opportunity for free decision and it must return a legally sovereign assembly composed, at least as to its majority, of mem-

(CONTINUED ON PAGE 145)

Washington Comment

(CONTINUED FROM PAGE 80)

tration and eliminate restrictive practices in areas where the most serious threat to a competitive enterprise economy is found.

(5) When appropriations requests for FTC and the Antitrust Division are considered by Congress, the statement submitted to include not only the amount recommended by the Budget Bureau, but also the amount originally requested by the agencies.

(6) Commerce Dept. to expand its small business activities.

(7) WAA to concentrate on selling to small business. In regard to surplus plants, small business should be favored, large plants should be split, and multiple tenancy programs considered.

Legislative Branch

If Congress has determined that concentration should be reduced, the following steps should be taken:

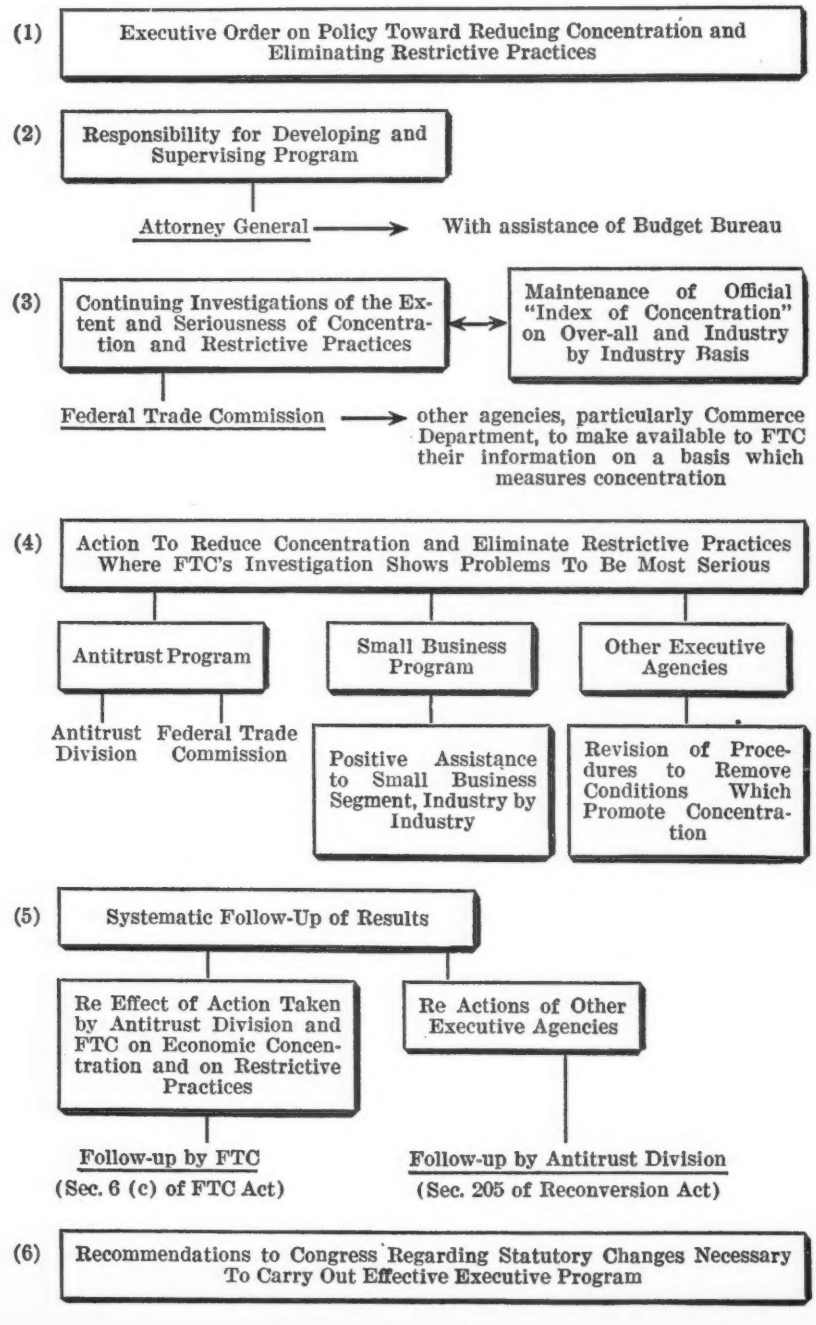
(1) Antitrust appropriations should be considered in terms of the size of the program necessary to bring out a reversal of the present trend.

(2) Congress should continually review existing legislation; give particular attention to the possibility of revising taxes so as to encourage new, independent enterprise; and consider legislation which would make all segments of the economy subject to a unified concentration policy.

(3) Section 7 of the Clayton act should be amended to include acquisitions of assets and to prohibit mergers and acquisitions regardless of whether the company to be merged or acquired is in the same industry or another industry—if the effect would be to give the merged companies an opportunity to exercise preponderant control over smaller companies. It is further recommended in this connection, that FTC be given authority under rules established by Congress to forbid such mergers and acquisitions above a specified size after making careful reviews of the facts surrounding the proposed merger or acquisition.

(4) Civil penalties be provided for a violation of the antitrust laws which would be proportionate to the illegal gains. For example, twice the monopoly profits.

SUMMARY OF RECOMMENDED STEPS FOR AN EFFECTIVE EXECUTIVE PROGRAM


(1) Executive Order on Policy Toward Reducing Concentration and Eliminating Restrictive Practices
(2) Responsibility for Developing and Supervising Program
Attorney General
With assistance of Budget Bureau
(3) Continuing Investigations of the Extent and Seriousness of Concentration and Restrictive Practices
Maintenance of Official "Index of Concentration" on Over-all and Industry by Industry Basis
Federal Trade Commission
other agencies, particularly Commerce Department, to make available to FTC their information on a basis which measures concentration
(4) Action To Reduce Concentration and Eliminate Restrictive Practices Where FTC's Investigation Shows Problems To Be Most Serious
Antitrust Program
Small Business Program
Other Executive Agencies
Antitrust Division
Federal Trade Commission
Positive Assistance to Small Business Segment, Industry by Industry
Revision of Procedures to Remove Conditions Which Promote Concentration
(5) Systematic Follow-Up of Results
Re Effect of Action Taken by Antitrust Division and FTC on Economic Concentration and on Restrictive Practices
Re Actions of Other Executive Agencies
Follow-up by FTC
(Sec. 6 (c) of FTC Act)
Follow-up by Antitrust Division
(Sec. 205 of Reconversion Act)
(6) Recommendations to Congress Regarding Statutory Changes Necessary To Carry Out Effective Executive Program

Otis Signs with Italians

Paris

• • • **An agreement** has been signed between the Italian Stigler manufacturing company and the Otis Elevator Co., New York, for the formation of a new company in Italy with equal financial contributions by both of the two companies. It is reported to be the first agreement for assistance of American capital in postwar Italian industry which has actually been concluded.

During the period from 1930-1939 production of elevators in Italy totaled about 3000 per yr, about a third of which was for export. Estimates are that prices will have increased to about 21 times their prewar level.

Canadian Steel Industry Slowly Reaching More Normal Business Level

Toronto

• • • **Business gradually** is swinging to a more normal basis in the Canadian iron and steel industry. Canadian steel mills opened the New Year with bookings sufficient to absorb all production to the middle of the year and officials of some companies estimate that there will be comparatively little easing in demand before the end of 1947.

The carry-over of orders from the early part of 1946 was great enough to take care of all steelmaking capacity through the first quarter and more recent placements have filled books to the end of June. While some producers again have withdrawn from the market, others are accepting orders of an if, as and when, delivery basis. Notwithstanding that price ceilings have been lifted on many items in the consumer goods' list within the past few weeks and other advances in prices are pending, no intimation has been forthcoming that there will be early increase in Canadian steel and pig iron prices.

Government officials state that by maintaining controls and ceiling prices they have eliminated many of the headaches of runaway inflation, and also have tended to peg prices from slipping rapidly downward on a basis similar to that which affected some articles in the United States at the beginning of the year. As a result of the uncertainty that prevails with regard to future iron and steel prices, new orders are being accepted with the provision that price will be be made known at time of shipment.

Dealing with the situation in Canada, H. G. Hilton, president of the Steel Co. of Canada, Ltd., stated that business in Canada continues to face the menace to production resulting from demands for heavy wage increases at frequent intervals such as have already contributed largely to increases in costs and higher wages. If the spiral of higher wages, higher costs and higher prices continues throughout 1947, he said, the latent purchasing power may fade away as prices go up. Already plans for new construction face, in many cases, costs which have risen to such an extent that some are being deferred. Were it not for such threats one could be reasonably optimistic about the future. Production of steel in Canada is at a maximum due to active domestic demand as well as the effect of loans extended to the United Kingdom and foreign countries, which have contributed indirectly to the maintenance of full capacity operations.

The fabricating industries which have been actively engaged in foreign orders include shipbuilding, locomotive, freight car and agricultural implement manufacturers, while the electrical and automotive trades and other industries producing durable goods made from steel are benefiting from the demand pent up by war restrictions.

Institute Protests High Tariff Rates For Raw Materials

New York

• • • **The duties imposed** on the raw materials which the steel industry must import into this country are very high, in contrast to the nominal duties (an average of about 10 pct on current prices) existing on finished steel products entering this country, said the American Iron & Steel Institute in a brief on file with the Committee for Reciprocity Information, in connection with the State Dept.'s projected trade agreement negotiations.

The tariff imposed on raw materials, such as fluorspar, magnesite, manganese ore, tungsten ore and tungsten, constitutes a great penalty on the American steel industry, said the institute. It estimated that the present duties range as high as 52 pct of the American selling price of magnesite and 61 pct of the American selling price of tungsten.

"No other steel producing country imposes such a penalty on its steel industry," said the institute. "The duties collected on one of these raw products alone exceeds all the duties collected on all of the manufactured steel products combined over any representative period.

The United States was declared to be the only "free market" for steel products in all the world. All other steel producing countries have imposed very high duties on imports of steel into their countries, and in some cases such duties have been prohibitive. The institute stated that the only way to lessen the great disparity between American nominal duties on steel imports and most other countries' high duties is to obtain concession from other countries in the form of tariff reductions on steel.

The institute also drew attention to the need for revision of our "anti-dumping" legislation.

"The American market, being large, easily accessible by low water rates to seaboard, and essentially unprotected by ordinary duties, is a likely victim of foreign dumping," said the institute. "Our declared national policy is against this trade practice, as evidenced by the enactment of the Anti-Dumping Act of 1921. This legislation, however, is completely ineffective. Either the Act requires remodeling (along the effective lines of the Canadian Anti-Dumping Act) so that it can operate at the customs house level to prohibit the practice, or recognition should be given to the fact that the only deterrent against dumping that now exists lies in the nominal ordinary duties now provided in the steel schedule. While it is not our belief that the present nominal duties will entirely prevent the practice, it is obvious that any concessions made in respect to such duties would tend only to further encourage it."

Reports 450,000 Homes Completed During 1946

Washington

• • • **Preliminary figures** show that more than 450,000 new permanent homes and apartments were completed during 1946, according to Frank R. Creedon, housing expediter. Most of these were privately financed, he added.

Mr. Creedon estimated that a million housing units were placed under construction during the year; these included about 700,000 new permanent units and 200,000 temporary conversions.

Industrial Briefs...

• BORROWS $8 MILLION — The Diamond Alkali Co., Pittsburgh, announced that final papers were signed on an $8 million 10-year bank loan to help complete a $20 million plant expansion and modernization program.

• NEW DIVISION — The new western division of the Monsanto Chemical Co., which consists of four plants, has recently been formed in Seattle, Wash.

• ADJUSTABLE LIGHTS — The Indiana Metal Products Corp., Rochester, Ind., have recently completed their new plant and are now producing the Edon 100 pct adjustable light fixture. This light was formerly owned by the Edon Products Co. of Chicago but the rights of manufacture have been taken over by Indiana Metal Products Corp.

• NORTHWEST ADDITION — The Pacific division of Link-Belt Co. in Seattle, have completed and are now occupying their newly built plant. The new plant contains complete machine shop equipment, larger warehouse facilities and an office building.

• ACQUISITION — Joint announcement by managements of both firms disclosed that the Lodge & Shipley Co., Cincinnati has acquired the turret lathe and hand screw machine business of the Acme Machine Tool Co., also of Cincinnati.

• WAA ASKS BIDS—The WAA has asked bids for the sale or lease of the government-owned bar mill, in Dunkirk, N. Y., which was operated during the war by the Allegheny-Ludlum Steel Corp. Bids will be opened Mar. 3.

• CHEMIST OF THE YEAR—Professor Glenn T. Seaborg of the University of California, co-discoverer of plutonium, source of atomic energy, has been chosen "Chemist of the Year" in a nationwide poll conducted by the American Chemical Society.

• JOINS WELDING GROUP—F. A. Fox will shortly be joining the staff of the British Welding Research Assn. as assistant director of research.

• OPENS SALES OFFICE — Bliss & Laughlin, Inc., has announced the opening of a district sales office in State Tower Bldg., Syracuse, N. Y. James D. MacPherson has been appointed as manager.

• MERGER — The Pennsylvania Engineering Works, builders of blast furnace and steel mill equipment, was merged into the Pennsylvania Engineering Corp.

• INDUSTRIAL WIRE—Mid-States Steel & Wire Co. will open a new plant in Florida, which will be in operation by June, for the manufacture of box binding and stapling wire used in the making of citrus boxes.

• ADDS FOUR SPEAKERS — The annual Chicago World Trade Conference to be held in the Stevens Hotel, Feb. 17, will present four additional speakers. In addition to the talk to be given by John Abbink, W. Averell Harriman, Secretary of Commerce, Donald M. Nelson, president of the Society of Independent Motion Picture Producers, Wayne A. Johnston, president of Illinois Central Railroad, and Barclay Acheson, director of International editions of the *Reader's Digest*, will be on the program.

• NEW AWARD — An honorary award known as the Charles H. McCrea Medal, to be given annually to the individual rendering most meritorious service to the malleable iron industry, has been announced by the Malleable Founders Society.

The medal is presented to the Society by National Malleable & Steel Castings Co., in memory of its late president, a leading figure in the industry and a director of the Malleable Founders Society from 1939 until his death in 1946.

FTC Makes Request For Broader Powers To Combat Mergers

Washington

• • • **Amendment of Sec. 7** of the Clayton Act in order to give the Federal Trade Commission broader powers "to curb more effectively the increasing mergers of competing corporations" was requested in the Commission's annual report to Congress for the fiscal year ending June 30, 1946.

A bill embracing such legislation (HR 4810) was approved and reported out of the House Judiciary Committee last year but did not reach the House floor for debate.

The FTC is also seeking amendment of the Clayton Act to give the Commission's cease-and-desist orders under that act the same sanctions and finality that its orders have under the FTC Act. Under the present Act as amended, such orders become final within 60 days unless judicial review is initiated.

In the report, the FTC revealed that it had charged 80 violations of the FTC Act and 11 violations of the Clayton Act among the 101 formal complaints filed during the year. These largely related to false or misleading advertising although four concerned alleged price-fixing and restraint of trade.

The Commission entered 89 cease-and-desist orders, including three price-fixing combinations and three price discriminations.

Also, during the year 96 stipulations were accepted by the Commission. This is a device by which a firm charged with a violation may voluntarily agree to cease-and-desist from practices objected to by the FTC and thereby avoid facing formal complaint and trial.

May Work Eagle Mountain

Los Angeles

• • • **Purchase by the Henry J. Kaiser interests of the 600 acre tract on the south side of Box Canyon Road, east of Mecca, Calif., for the purpose of developing a 100-home housing project for mine workers at the Eagle Mountain mines, indicates that this steel producer plans to proceed with the development of the mines, title for which is now under a cloud through suit filed by Harlan Bradt.**

Construction Steel . . .

New York

• • • **Fabricated steel awards** this week included the following:

2005 **Tons,** Wilmington, Calif., harbor steam plant, units 3, 4 and 5, to Bethlehem Pacific Coast Steel Corp., San Francisco.

700 **Tons,** Smith Bluff, Tex., two storage tanks for Pure Oil Co. to Hammond Iron Works, Warren, Pa.

500 **Tons,** Los Angeles, berths 179, 180, transit shed, to Union Iron & Steel Co.

500 **Tons,** Marianna, Pa., coal washing plant to American Bridge Co., Pittsburgh.

300 **Tons,** Whiting, Ind., compressor unit for Standard Oil Co. to American Bridge Co., Pittsburgh.

125 **Tons,** Los Angeles, addition to Capital Exchange building, Southern California Telephone Co., to Consolidated Steel Co.

• • • **Fabricated steel inquiries** this week included the following:

8000 **Tons,** Pomona, Calif., Fruehauf Trailer Co.

3000 **Tons,** Los Angeles, building for General Petroleum Co.

2500 **Tons,** Woodlawn, S. C., trestle, U. S. Engineers.

1450 **Tons,** Los Angeles, Crown-Zellerbach warehouse.

1000 **Tons,** Devils Slide, Utah, conveyor gallery for Stearns Rogers Co.

850 **Tons,** San Francisco, Purchaser of Supplies, City Hall, Inv. 3801, girder rail for Railway Dept., bids to Jan. 20.

700 **Tons,** Sigurd, Utah, plaster board building for U. S. Gypsum Co., Chicago.

400 **Tons,** Clark Hill, S. C., Clark Hill Dam, U. S. Engineers.

340 **Tons,** Tuscaloose, Ala., addition to paper mill for H. R. Ferguson.

300 **Tons,** Decatur, Ill., eight propane tanks for Illinois Power Co.

300 **Tons,** Berwick, Pa., Berwick Weaving Co., building, bids in.

300 **Tons,** Glendale, Calif., addition to Southern California Telephone Co. building.

250 **Tons,** Urbana, Ill., electrical engineering building, University of Illinois.

140 **Tons,** Swink, Colo., bridge on State Highway 6, State Highway Engineer, Denver, bids to Jan. 14.

100 **Tons,** Los Angeles, County Purchasing Agent, Quot. 2361.

100 **Tons,** Caspar, Wyo., penstocks, U. S. Bureau of Reclamation.

• • • **Reinforcing bar inquiries** this week included the following:

160 **Tons,** Chicago, building for Alden has been abandoned.

100 **Tons,** Portland, Ore., reservoirs and pump houses, Home Water District, bids to Jan. 20.

Marks and Nickel Join Dearborn Motors Corp., New Ford Distributor

Detroit

• • • **James H. Marks,** former executive vice-president of the Packard Motor Co. and Vernon E. Nickel, former assistant manager of the marketing and organizational department of Nash-Kelvinator have joined Dearborn Motors Corp. which will succeed Harry Ferguson, Inc., as distributor for Ford tractors on June 30, 1947. At the same time it was announced by Frank R. Pierce, president, that Arthur H. Kitson, former eastern manager for Harry Ferguson Inc., has joined the new company.

Mr. Marks will serve on the executive staff of the newly formed company as a consultant to coordinate the procurement and engineering of farm implements. Mr. Nickel will direct consumer research and Mr. Kitson becomes a member of the sales staff.

Mr. Marks joined Packard in 1916 as plant engineer and served as manufacturing manager and industrial engineer until 1925 when he was named director of purchases a post he held until 1940. At that time he was named vice-president of Packard.

Mr. Kitson was associated with Norge Division of Borg-Warner for 10 years. During the war he held the post of sales manager of Detroit gear aircraft parts division of Borg-Warner. He became a member of the Ferguson sales organization 2 years ago.

Mr. Nickel joined Nash-Kelvinator in 1940 after 6 years with the frigidaire division of General Motors as a sales analyst in the market research department. He is a graduate of the University of Cincinnati.

CASE BILL REVIVED: *Rep. Francis Case (R-S.D.) at work in his office on Capitol Hill on the new Case labor bill which he has completed. A new version of the bill killed last year by presidential veto, Representative Case said that it was intended to let labor and management "live in peace."*

Construction Approvals Advanced to $50 Million

Washington

• • • **An increase from** the former $35 million weekly rate of approvals in nonresidential construction to $50 million has been made by CPA on the order of Gen. Philip B. Fleming, administrator of the Office of Temporary Controls.

Overall effects of the increase will not be as great as it appears on the surface, however. Agricultural nonresidential building permits will be handled by CPA instead of by local farm boards and will now be included in the ceilings; also, the CPA action was partially necessitated in order to take up slack in actual construction because of increased prices of materials.

Also hastening the action was the revision of two rules regarding approvals. CPA field offices have been notified to approve construction of foundations and structural frames in areas where there is heavy unemployment in heavy construction trades; likewise, field offices have been authorized to liberalize treatment of applications to erect prefabricated steel structures, such as quonset huts, where little or no additional critical materials are needed.

Controls on Coal Dropped

Washington

• • • **After consulting** with the industry advisory groups, the Solid Fuels Administration has ended the special controls on the distribution of bituminous coal which were imposed during the recent coal strike for the purpose of assuring supplies for the most essential uses.

Controls in effect before the strike or superseded by the emergency orders continue in effect. These generally prohibit reserve stockpiling until more coal is available to provide for shipments first to retailers for domestic space heatings and next to industries.

MACHINE TOOLS

. . . News and Market Activities

Market Remains Quiet; With Outlook Regarded as Fair

• • • **While portal** to portal pay suits have been piling up in the machine tool industry in the last few days, major concern at the moment of most segments of the industry is how much the machine tool market can absorb in 1947. Because many orders were placed in December before some of the price increases became effective, January has been a little quiet thus far, but little discouragement is evident among the machine tool builders.

Machine tool activity in the Detroit area is only fair, based on a survey of producers and sales outlets in the area. The demand for highly specialized machines and tools continues at satisfactory levels but orders for standard equipment have fallen off sharply with much of this business going to surplus.

Several large producers have been forced to reduce their personnel substantially in recent months and activity in tool and die shops is being maintained largely by orders for refrigerator, stove, aircraft and other nonautomotive industries. This has come to be a substantial part of the tooling business placed in Detroit and is particularly welcome with the slowing down or indefinite postponement of new model cars.

A number of highly specialized welding machines are being installed in the various automotive plants and promising experimental work is being done on welding equipment that is adaptable to heavy structures. With the return of high automobile production rates, expendable tools are also being used in quantity and there has been a noticeable increase in the demand for such items.

In the Cincinnati area, articles of incorporation were filed with the Secretary of State in Ohio for Lauren Bros. Inc., Norwood, Ohio. Manufacturers of machine tools, this company has been in existence for some time. However, the Cincinnati market is very quiet this week and a resumé of the year's business shows many machine tool companies formerly individually operated or a partnership have been incorporated. Several changed hands, including two changes for the Acme Machine Tool Co., while almost all companies are planning postwar output and some expansions. Labor difficulties are for the present under control, but several Cincinnati firms have been named defendents in portal-to-portal pay suits.

Labor Disturbances Are Under Control But Portal Pay Suits Are Mounting

o o o

In all, the general outlook for the coming year is fair, though not expected to be too good either in the domestic or foreign field until labor problems are more settled. Some sources indicate that they expect business to start picking up during the summer, while others do not see any extension until late fall or early in 1948.

In Boston and the East, the rank and file of metalworking plants are not doing much tool buying at the moment, with a year-end inventory and readjustment period at hand. That builders and their representatives took in the Cincinnati meeting emphasizes to some extent the quietness of the market.

Anticipation in the tool industry is generally optimistic, and not a few builders have already booked business this new year and have a fairly representative number of quotations outstanding which they feel will result in orders. Backlogs as a rule are reassuring; a majority are comfortably well off financially, paying the third highest industrial group average weekly wage, and have confidence in labor.

In Washington, War Assets Administration announced that a $58 million inventory of war surplus cutting tools, formerly offered for sale through industry agreements, will now be offered on a competitive bid basis.

The large inventory, expected to be increased by an estimated $25 million worth yet to be declared surplus, consists of nearly 198 million pieces in 26,000 sizes. Included are twist drills ranging in diameter from 0.0135 in. to 4 in., reamers ranging from .0 in. to 4 in., and milling cutters ranging from .015 in. to 12 in.

Under the industry agreements, of which there were 40, the tools were returned by WAA to the manufacturer who segregated standard tools from special single-purpose tools. The manufacturer agreed to offer for sale 25 pct of the surplus standard cutting tools along with 75 pct of new production. The manufacturer received 17 pct commission on what he sold.

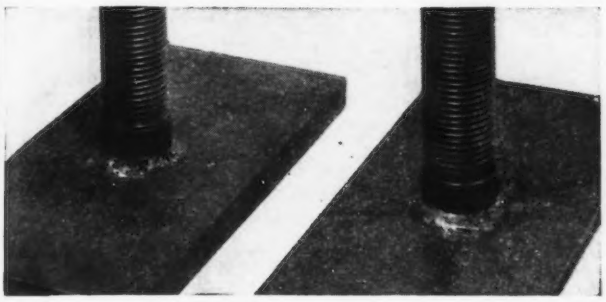
Under the competitive bid system, the tools will be offered in lots of not less than $5000 in acquisition cost. The lots will be composed of tools of three categories—new standard catalog items in original manufacturer's containers; new standard catalog items not in original manufacturer's containers; and used standard tools and new and unused special purpose tools. The inventory contains approximately $17 million worth (acquisition cost) of special single-purpose tools.

According to WAA officials, $100 million worth of cutting tools are produced annually and, in view of the fact that current surplus stocks represent only 6 months' supply, no serious impact on industry is anticipated.

The tools are located principally in the seven industrial regional offices of WAA—Detroit, Cleveland, Cincinnati, Chicago, New York, Philadelphia and Boston—but most WAA regional offices have inventories. An adequate reserve will be held for priority purchasers.

New electrode simplifies tough-to-weld jobs

"Shield-Arc LH-70" is a new heavily coated electrode designed primarily for the welding of steels of poor weldability. Its as-welded properties are 75,000 to 80,000 lbs. per sq. inch and 25% to 30% elongation in 2". Stress relieved tensile strength is 70,000 lbs. per sq. in. minimum. Normally it produces a convex bead.



Welds made in high-sulphur steel. Left: Made with mild steel electrode. Right: Made with new "Shield-Arc LH-70" Electrode.

Typical Applications. Experience to date shows that this electrode produces exceptional results in these applications:

Low alloy high tensile steels which cannot be preheated.
High sulphur (free machining) steels.
High carbon, medium carbon steels.
High silicon electrical sheet steel.
For welds to be porcelain-enameled without annealing.

Procedure. Use DC—electrode positive, work negative. Hold a short arc. 1/8" and 5/32" may be used for vertical and overhead positions, single or multiple pass. Make vertical welds from bottom upward. Make overhead welds with stringer beads or narrow lateral weave.

CURRENT RANGE	
Rod Size	Amperes
1/8"	100—135
5/32"	140—190
3/16"	180—250

For further details, call the Lincoln Welding Engineer nearby or write THE LINCOLN ELECTRIC CO., Dept. 141, Cleveland 1, O.

Butt welding medium carbon (.50% C) steel sprocket teeth forgings with the new Lincoln "Shield-Arc LH-70" Electrode.

NONFERROUS METALS

. . . News and Market Activities

British Ministry Ups Nonferrous Prices

London

• • • **The British** Minister of Supply has issued the Control of Nonferrous Metals (No. 26) Order, which came into force on Jan. 1, 1947. This revokes the previous order and increases the maximum prices of copper, lead, zinc and zinc products as follows:

	Per long ton	
Copper	£19	(about $76)
Lead	£15	(about $60)
Zinc	£15	(about $60)
Zinc sheets	£15	(about $60)
Zinc oxide	£12.15	(about $51)

The price of high conductivity electro copper is thus increased from about $392 to $468 per long ton; good soft pig lead (Empire and domestic) from about $220 to $280 per long ton; and zinc (f.o.b. domestic and Prime Western) from about $220 to $280 per long ton. Prices for other forms of the metals are correspondingly adjusted. The price of zinc sheets is increased from about $264 to $324 per long ton ex works, and for red seal zinc oxide from about $224 to $275 per long ton delivered, with a similar increase for the other forms of zinc oxide.

•

Lead

New York

• • • **Lead is** firm at the newly increased prices of 12.80¢ St. Louis, 13.00¢ New York in view of the new London price of 12.59¢ per lb to which 1.0625¢ duty must be added, bringing the total to 13.65¢. Consumers of lead are still in serious need of supplies despite the allocation of a small amount of lead during January from the government stockpile.

Far western producers have been operating on a 6-day week since the end of December. Domestic producers are now arranging for the importation of lead from Mexico and Canada and the foreign supplies should be available to consumers in February.

•

Zinc

New York

• • • **Zinc is** still holding at the former price of 10.50¢ per lb, East St. Louis. The new London price is established at 12.59¢ which with only 7/8¢ per lb duty is likely to draw off some domestic supplies for foreign shipment. However it is believed that there might be some difficulty in obtaining export licenses for zinc.

Domestic consumers are still hampered by shortages of Prime Western and Special High Grade.

•

Copper

New York

• • • **With the approach** of February the need for the beginning of private importation of copper becomes acute with declining OMR reserves. Copper will continue to come into the country during the first quarter under RFC contracts for foreign copper placed before the end of the year. However there is said to have been no private importation except small tonnages on drawback arrangements. Meanwhile withdrawals from the stockpile for allocation are expected to exhaust reserves by the end of February.

Copper is reported to be selling at 19.75¢ to 20.00¢ per lb, f.a.s. New York. With the addition of 4¢ duty, the price of foreign copper delivered New York is brought close to 24¢ per lb. The Tariff Commission is scheduled to begin hearings at Washington on the copper tariff on Jan. 20. The latest applicant for a reduction or abolition of the tariff on copper is the Chilean government which is said to have appealed for abolition of the tariff through direct government application.

Consumers are receiving most of their requirements of copper and the earlier extreme shortage of wire bars is said now to be not as acute as formerly.

•

Nickel

New York

• • • **The new spot** warehouse price for electrolytic nickel has now been established to take into consideration the increased contract price and higher freight rates. Whitehead Metal Products Co. of New York has established the price for electrolytic nickel cathode squares of 9 in. at a price of 37.67¢ per lb, f.o.b. New York. The same price is applicable to "F" nickel shot at New York.

•

To Provide January Lead

Washington

• • • **A small portion** of government-held stocks of lead will be distributed by CPA during January. This action was taken by CPA to bridge the gap between the revocation of controls on lead, which became effective Dec. 27, and the resumption of full scale private distribution. The January distribution will be made on the basis of requests filed with CPA up to and including Dec. 20 on Form CPA 95.

•

Raise Tungsten Ore Price

London

• • • **The British Ministry** of Supply has announced that as from January 1, 1947, the price of tungsten ore of standard grade will be increased from $14 to $15 per unit of WO_3 delivered at consumers' works. For special high grade scheelite to the following specifications: WO_3 min 68 pct, tin max 0.60 pct, arsenic max 0.10 pct, molybdenum max 0.10 pct, the price will be $16 per unit WO_3 delivered consumers' works.

Nonferrous Metals Prices

Cents per pound

	Jan. 8	Jan. 9	Jan. 10	Jan. 11	Jan. 13	Jan. 14
Copper, electro, Conn.	19.50	19.50	19.50	19.50	19.50	19.50
Copper, Lake, Conn.	19.625	19.625	19.625	19.625	19.625	19.625
Tin, Straits, New York	70.00	70.00	70.00	....	70.00	70.00
Zinc, East St. Louis	10.50	10.50	10.50	10.50	10.50	10.50
Lead, St. Louis	12.80	12.80	12.80	12.80	12.80	12.80

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, f.o.b. shipping point (min. 10,000 lb)	15.00
Aluminum pig, f.o.b. shipping point	14.00
Antimony, American Laredo Tex.	28.25
Beryllium copper, 3.75-4.25% Be; dollars per lb contained Be	$14.75
Beryllium aluminum, 5% Be; dollars per lb contained Be	$27.50
Cadmium, del'd	$1.50
Cobalt, 97-99% (per lb)	$1.50 to $1.57
Copper, electro, Conn. Valley	19.50
Copper, lake, Conn. Valley	19.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$125.00
Lead, St. Louis	12.80
Lead, New York	13.00
Magnesium, 99.8 + %	20.50
Magnesium, sticks, carlots	36.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$88 to $90
Nickel, electro, f.o.b. New York	37.67
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$58 to $61
Silver, New York, cents per oz.	82.00
Tin, Straits, New York	70.00
Zinc, East St. Louis	10.50
Zinc, New York	11.005
Zirconium copper, 6 pct Zr, per lb contained Zr	$ 6.00

Remelted Metals

Brass Ingot

(Cents per lb, in carloads)

85-5-5-5 ingot	
No. 115	20.50
No. 120	20.00
No. 123	19.50
80-10-10 ingot	
No. 305	23.50
No. 315	22.00
88-10-2 ingot	
No. 210	25.75
No. 215	24.75
No. 245	21.75
Yellow ingot	
No. 405	16.25
Manganese Bronze	
No. 421	18.25

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys:	
0.30 copper, max.	18.25
0.60 copper, max.	18.00
Piston alloys (No. 122 type)	16.75—17.00
No. 12 alum. (No. 2 grade)	16.50—16.75
108 alloy	16.50—16.75
195 alloy	16.75—17.50
AXS-679	16.50—16.75
Steel deoxidizing aluminum, notch-bar, granulated or shot.	
Grade 1—95 pct-97½ pct	16.75—17.00
Grade 2—92 pct-95 pct	16.25—16.50
Grade 3—90 pct-92 pct	15.75—16.00
Grade 4—85 pct-90 pct	15.25—15.50

Electroplating Supplies

Anodes

(Cents per lb, f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	34⅞
Electrodeposited	28⅝
Rolled, oval, straight delivered	29⅛
Curved, 18 in. or longer, delivered	29⅛
Brass, 80-20, frt allowed	
Cast, oval, 15 in. or longer	31⅝
Zinc, Cast, 99.99	18¾
Nickel, 99 pct plus, frt allowed	
Cast	51
Rolled, depolarized	52
Silver, 999 fine	
Rolled, 1000 oz lots, per oz.	90.00

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	34.00
Copper sulphate, 99.5, crystals, bbls	7.75
Nickel salts, single, 425 lb bbls, frt allowed	14.50
Silver cyanide, 100 oz lots, per oz	74.5
Sodium cyanide, 96 pct, domestic, 100 lb drums	15.00
Zinc cyanide, 100 lb drums	33.00
Zinc, sulphate, 89 pct, crystals, bbls, frt allowed	.0635

Mill Products

Aluminum

(Cents per lb, base, subject to extras for quantity, gage, size, temper and finish)

Drawn tubing: 2 to 3 in. OD by 0.065 in. wall: 3S, 43.5¢; 52S-O, 67¢; 24S-T, 71¢; base, 30,000 lb.

Plate: ¼ in. and heavier: 2S, 3S, 21.2¢; 52S, 24.2¢; 61S, 23.8¢; 24S, 24S-AL, 24.2¢; 75S, 75S-AL, 30.5¢; base, 30,000 lb.

Flat Sheet: 0.136-in. thickness: 2S, 3S, 23.7¢; 52S, 27.2¢; 61S, 24.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 32.7¢; base, 30,000 lb.

Extruded Solid Shapes: factor determined by dividing the perimeter of the shape by its weight per foot. For factor 1 through 4, 3S, 26¢; 14S, 32.5¢; 24S, 35¢; 53S, 61S, 28¢; 63S, 27¢ 75S, 45.5¢; base, 30,000 lb.

Wire, Rod and Bar: screw machine stock, rounds, 17S-T, ¼ in., 29.5¢; ½ in., 37.5¢; 1 in., 26¢; 2 in., 24.5¢; hexagons, ¼ in., 35.5¢; ½ in., 30¢; 1in., 2 in., 27¢; base, 5000 lb. *Rod:* 2S, 3S, 1¼ to 2½ in. diam, rolled, 23¢; cold-finished, 23.5¢ base, 30,000 lb. *Round Wire:* drawn, coiled, B & S gage 17-18: 2S, 3S, 33.5¢; 56S, 39.5¢; 10,000 lb base; B & S gage 00-1: 2S, 3S, 21¢; 56S, 30.5¢. B & S 15-16: 2S, 3S, 32.5¢; 56S, 38¢; base, 30,000 lb.

Magnesium

(Cents per lb, f.o.b. mill)

Sheet and Plate: Ma, FSa, ¼ in.,54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 14, 69¢-74¢; 16, 79¢-81¢; 18, 87¢-89¢; 22, $1.25-$1.31; 24, $1.71-$1.75. Base quantity, 30,000 lb.

Round Rod: M, diam in. ⅛, 55¢; ¼, 47¢; ⅜, 46¢; ½, 45¢; ¾, 44¢; 1¾, 43.5¢; 2, 42.5¢; 3, 41.5¢; 4, 42.5¢ 5, 43.5¢; 6 & 7 in., 44¢. Base price, 5000-10,000 lb.

Square and Hexagonal Bar: M, diam in. ⅛, 58¢; ¼, 50¢; ⅜, 48¢; ½, 47.5¢; ¾, 46.5¢; 1¾, 45.5¢; 2, 44.5¢; 3, 43.5¢; 4 & 5 in. 44.5¢; 6 & 7 in., 45¢. Base quantity, 5000-10,000 lb.

Tubing: Varies with wall thickness and outside diameter.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	54	43
No. 35 sheets	..	41
Strip, cold-rolled	60	44
Rod		
Hot-rolled	50	39
Cold-drawn	55	44
Angles, hot-rolled	50	39
Plates	52	41
Seamless tubes	83	71
Shot and blocks	..	31

Zinc

(Cents per lb, f.o.b. mill)

Sheet, l.c.l.	15.40
Ribbon, ton lots	14.50
Plates	
Small	13.25
Large, over 12 in.	14.25
Lithographic, ungrained	17.25

Copper, Brass, Bronze

(Cents per lb)

	Extruded Shapes	Rods	Sheets
Copper	30.78	....	30.93
Copper, hot-rolled	....	27.28	....
Copper, drawn	....	28.28	....
Low brass, 80 pct	37.52	28.71	29.02
High brass	36.03	27.22	27.53
Red brass, 85 pct	38.03	29.22	29.53
Naval brass	27.50	26.25	32.19
Brass, free cutting	....	22.28	....
Commercial bronze	39.06	30.25	30.56
Manganese bronze	31.07	29.57	35.69
Phosphor bronze, 5 pct	....	49.07	48.82
Muntz metal	27.19	25.94	30.38
Everdur, Herculoy Olympic, etc.	34.45	34.73	35.79
Nickel silver, 5 pct.	....	33.11	36.34
Architectural bronze	26.01	....	....

Scrap Metals

(Dealers' buying prices, f.o.b. New York)

Copper and Brass

(Cents per lb)

No. 1 heavy copper and wire	15½—16
No. 2 heavy copper and wire	14½—15
Light copper	13¼—13⅜
Auto radiators (unsweated)	11¼—11⅜
No. 1 composition	14½—15
No. 1 composition turnings	14 —14½
Clean red car boxes	11 —11½
Cocks and faucets	11½—12
Mixed heavy yellow brass	9 — 9½
Old rolled brass	9 — 9½
Brass pipe	10¾—11¼
New soft brass clippings	11 —11½
Brass rod ends	9¾—10¼
No. 1 brass rod turnings	10 —10½

Aluminum

(Cents per lb)

Alum. pistons with struts	4½— 5
Aluminum crankcases	7½— 8
2S aluminum clippings	8¼— 8½
Old sheet & utensils	7½— 8
Mixed borings and turnings	3 — 3¼
Misc. cast aluminum	7 — 7½
Dural clips (24S)	6 — 6½

Zinc

(Cents per lb)

New zinc clippings	7 — 7⅛
Old zinc	5¼— 5¾
Zinc routings	3 — 3⅛
Old die cast scrap	3 — 3¼

Nickel and Monel

(Cents per lb)

Pure nickel clippings	21 —22
Clean nickel turnings	17 —18
Nickel anodes	19½—20½
Nickel rod ends	20 —21
New Monel clippings	14 —15
Clean Monel turnings	10 —11
Old sheet Monel	12 —12½
Old Monel castings	10 —11
German silver clippings, mixed	10½—11
German silver turnings, mixed	7 — 7¼

Lead

(Cents per lb)

Soft scrap lead	11 —11½
Battery plates (dry)	5¼— 5½

Miscellaneous

(Cents per lb)

Block tin	60
No. 1 pewter	46 —48
No. 1 auto babbitt	36 —37
Mixed common babbitt	12 —12½
Solder joints	13½—14
Siphon tops	38
Small foundry type	15 —15½
Monotype	12½—13
Lino and stereotype	12 —12½
Electrotype	10 —10½
New type shell cuttings (nom.)	12 —12½
Clean hand picked type shells	5½— 6
Lino and stereo dross	6 — 6½
Electro dross	4 — 4½

Lead Products

(Cents per lb)

F.o.b. shipping point freight collect. Freight equalized with nearest free delivery point.

Full lead sheets	16.25
Cut lead sheets	16.75
Lead pipe, manufacturing point	15.50
Lead traps and bends	List +38%
Combination lead and iron bends and ferrules, also combination lead and iron ferrules	List +38%
Lead wool	17.50

SCRAP

Prices Firm, Tie-In Sales Worry Trade

New York

• • • **No significant price** changes were chalked up in the nation's scrap markets during the past week. Signs point to a fair degree of strength beneath current open-hearth steel prices but it is felt in some quarters that any definite indications of a sure and steady supply may cause price breaks.

While prices appear somewhat stabilized at the moment observers point out that the relatively small volume moving these days makes prices more readily subject to **wide fluctuations. A subject which** came in for a great deal of discussion at the scrap convention held here last week was the extent of the volume of tie-in and earmarked scrap moving to the steel mills these days. Brokers are therefore doing a larger percentage of their business with dealers since many large shipments of industrial scrap no longer move through their hands.

A report on the New York convention of the Institute of Scrap Iron & Steel appears on p. 111 *of this issue.*

Thus it is said that a fair degree of stability in the scrap market is dependent to some extent on volume moving through normal channels, and under present practices the only substantial increase in shipments which can be expected is in the now relatively smaller amounts which are processed through dealers.

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PITTSBURGH—Scrap here seems to have settled down to a fairly steady market, with the openhearth grades and railroad heavy melting moving at the $32 to $32.50 range. Major consumers here have withdrawn from the $25 New England and $26.50 Northern New Jersey and New York markets, getting enough scrap from closer sources. The flow of scrap here has been boosted by greater volume of production scrap from Ohio and Detroit, plus a greater movement from yards—scrap that was allegedly held back during December. Eastern railroads are holding firm on present prices, but the western roads are taking what the market will bring. This forces mill consumers to stay out of the railroad scrap market in Chicago, since they will not pay more in that area than they will to railroads in the East. New York Central, Pittsburgh & Lake Erie and B & O have all waived the $1 differential for railroad heavy melting over the openhearth scrap prices, and are maintaining to mill consumers the normal differential between No. 1 and the specialties. Mills are definitely conscious of the high price of scrap, and any signs of a sure and steady supply will mean a break in prices, it is said. However, at present the market is strong and there are no signs of any price breaks.

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CHICAGO—The market on heavy melting continues solidly stabilized at $30 delivered in this area. Shipments last week were decidedly better than they have been with bad weather not too large a factor. The mills have not been able to build up inventory stocks, however, and they see little hope of doing so for the balance of the winter. Railroad specialties continue to vary widely and a conversion feature plus private deals on scrap rails have complicated the representative price on this item.

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PHILADELPHIA — Scrap prices continued at previous levels here last week. It is reported that one mill has gone out of the market for a week or two in expectation that there may be a drop in the market. However observers can't see any immediate reasons for a decline in the next few weeks. Most mills here have adequate minimum stocks of scrap for the time being and are more concerned now about pig iron which is in very short supply.

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NEW YORK—The 50¢ increase effected here in openhearth steel prices during the past week apparently indicates broker conviction that there is some strength beneath current prices. This move now brings New York buying prices approximately into their OPA relationship, with due allowance for a larger broker's profit in a free market. More tonnage, it is reported, is moving at the $26.50 than the $27 figure. Some small foundries indicate their cast supply so improved that they are balking at current prices and talking of withdrawing from the market for a week or two.

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DETROIT—The price of heavy melting and foundry grades is unchanged this week and appears for the moment to be reasonably stabilized at the present level. As has been true for many months, a very large volume of scrap is being earmarked for shipment to steel centers outside Detroit and this volume which moves in a more or less controlled rather than a free market is an important factor in determining price quotations. There is evidence of strong pressure by scrap buyers to keep prices down but the continued heavy demand has thus far restricted any downward tendency in market prices. There is, however, evidence of restricted buying for foundry use and the first weakness in the market, if it develops, is expected to be in foundry grades.

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CLEVELAND—Market activity is at a low ebb. Plant scrap is continuing to move, but collections are bad and some of the dealers have been unable to make shipments in the last few days. Major buying locally centers around the blast furnace grades, since some consumers have a little openhearth scrap on the ground. Prices are holding firm, but some foundries are in bad shape for scrap and in these cases price is no longer a factor.

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BOSTON—Gas purifiers still refuse to offer more than $21 a ton for chemical borings and one claims to have just closed a three months' contract at $18.06. In contrast, steel mills will pay $21 a ton and better for cast iron borings. A fair tonnage of machinery cast was moved to foundries the past week at $40 to $45 a ton. With dismantling at a minimum, heavy breakable cast is hard to get and badly needed.

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BUFFALO—All grades of scrap are tight in this market with prices apparently stabilized at the peak levels. Failure of supplies to improve in the new year has been a keen disappointment to steel makers. One mill is reported to have only enough scrap for 2 weeks of operation at the current high rate, and predictions are heard that some furnaces will be shut down in the next week or two.

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CINCINNATI—The iron and steel scrap market has an appearance of being a trifle confused, although prices are still holding. Reports of softening on the shop grades in other areas causes a slight nervousness here, while reports of higher prices in other districts continue to keep the picture uncertain. For the most part consumers are accepting material on contracts, but some resistance against prices continues to be reported.

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BIRMINGHAM—Scrap prices here are stationary and little change is expected during the winter months. Although the advances that followed the end of OPA have brought out a much larger flow of material to dealers' yards, inclement weather has drastically reduced preparation. Mills in this area, however, are able to obtain sufficient steel grades to meet needs. Demand for cast grades is as great as ever with supplies seeming to grow shorter by the day.

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SAN FRANCISCO—Rigid scrap prices which have been holding on the West Coast broke with a $2 rise in principal grades in Seattle. Current quotations are No. 1 and 2 and electric Furnace, $19, and railroad heavy, $20. Buyers report deliveries continue at 80 pct of capacity requirements.

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TORONTO—Business continued dull in the Canadian scrap iron and steel markets during the past week, with most dealers trying to dig themselves out after the heavy snowfall since the beginning of the year. No deliveries of scrap by truck from outside points have been reported and movement from industrial plants also has slowed down considerably. The scrap shortage in Canada has reached serious proportions. Steel mills are rapidly coming to the end of their reserve and their receipts are well below actual needs.

IRON AND STEEL SCRAP PRICES

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$32.00 to $32.50
RR. hvy. melting	32.00 to 32.50
No. 2 hvy. melting	32.00 to 32.50
RR. scrap rails	34.00 to 34.50
Rails 3 ft. and under	35.50 to 36.50
No. 1 comp'd bundles	32.00 to 32.50
Hand bdld. new shts.	32.00 to 32.50
Hvy. axle turn.	32.00 to 32.50
Hvy. steel forge turn.	31.50 to 32.00
Mach. shop turn.	27.50 to 28.00
Short shov. turn.	29.00 to 29.50
Mixed bor. and turn.	27.50 to 28.00
Cast iron borings	28.50 to 29.00
No. 1 cupola cast	40.00 to 40.75
Heavy breakable cast	30.00 to 32.00
Malleable	38.00 to 39.00
RR. knuck, and coup.	36.50 to 37.50
RR. coil springs	36.50 to 37.50
Rail leaf springs	36.50 to 37.50
Rolled steel wheels	36.50 to 37.50
Low phos.	34.50 to 35.00

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$29.50 to $30.00
No. 2 hvy. melting	29.50 to 30.00
No. 1 bundles	29.50 to 30.00
No. 2 dealers' bndls.	29.50 to 30.00
Bundled mach. shop turn.	29.50 to 30.00
Galv. bundles	27.50 to 28.00
Mach. shop turn.	24.50 to 25.00
Short shovels, turn.	26.50 to 27.00
Cast iron borings	24.50 to 26.00
Mix. borings & turn.	24.50 to 25.00
Los. phos. hvy. forge	33.50 to 36.00
Low phos. plates	32.50 to 35.00
No. 1 RR. hvy. melt.	30.50 to 31.00
Reroll rails	33.50 to 34.50
Miscellaneous rails	33.50 to 34.50
Angles & splice bars	35.50 to 36.00
Locomotive tires, cut	35.00 to 37.00
Cut bolster & side frames	35.50 to 36.00
Standard stl. car axles	35.00 to 36.50
No. 3 steel wheels	33.00 to 35.00
Couplers & knuckles	33.00 to 35.00
Malleable	40.00 to 45.00
No. 1 mach. cast	40.00 to 45.00
Rails 3 ft. and under	37.50 to 40.00
No. 1 agricul. cast	36.00 to 38.00
Hvy. breakable cast	36.00 to 38.00
RR. grate bars	35.00 to 36.00
Cast iron brake shoes	35.00 to 36.00
Stove plate	36.00 to 38.50
Clean auto cast	37.00 to 40.00
Cast iron carwheels	35.00 to 37.50

CINCINNATI

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

No. 1 hvy. melting	$28.50 to $29.00
No. 2 hvy. melting	28.50 to 29.00
No. 1 bundles	28.50 to 29.00
No. 2 bundles	28.50 to 29.00
Mach. shop turn.	23.50 to 24.00
Shoveling turn.	24.50 to 25.00
Cast iron borings	23.50 to 24.00
Mixed bor. & turn.	23.50 to 24.00
Low phos. plate	30.50 to 31.00
No. 1 cupola cast	33.00 to 35.00
Hvy. breakable cast	31.00 to 33.00
Stove plate	28.00
Scrap rails	26.00

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars

No. 1 hvy. melting	$25.00 to $26.00
No. 2 hvy. melting	25.00 to 26.00
Nos. 1 and 2 bundles	25.00 to 26.00
Busheling	25.00 to 26.00
Turnings, shovelings	22.00 to 23.00
Machine shop turn.	22.00 to 23.00
Mixed bor. & turn.	19.00 to 20.00
Cl'n cast. chem. bor.	21.00 to 23.00
No. 1 machinery cast	40.00 to 45.00
No. 2 machinery cast	40.00 to 45.00
Heavy breakable cast	40.00
Stove plate	40.00 to 45.00

DETROIT

Per gross, ton, brokers' buying prices, f.o.b. cars:

No. 1 hvy. melting	$26.75 to $27.25
No. 2 hvy. melting	26.75 to 27.25
No. 1 bundles	26.75 to 27.25
New busheling	26.75 to 27.25
Flashings	26.75 to 27.25
Mach. shop turn	19.25 to 20.25
Short shov. turn	21.25 to 21.75

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages. Pending establishment of a market in some districts and in certain grades, the former OPA ceiling price is inserted for reference, followed by an asterisk.

Cast iron borings	$20.75 to $21.25
Mixed bor. & turn.	20.25 to 20.75
Low phos. plate	29.25 to 29.75
No. 1 cupola cast	41.25 to 44.25
Charging box cast	40.25 to 43.25
Hvy. breakable cast	37.25 to 39.25
Stove plate	37.25 to 39.25
Automotive cast	nominal

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$30.50 to $31.50
No. 2 hvy. melting	30.50 to 31.50
No. 1 bundles	30.50 to 31.50
No. 2 bundles	30.50 to 31.50
Mach. shop turn.	23.00 to 24.00
Shoveling turn.	23.50 to 24.25
Cast iron borings	23.00 to 24.00
Mixed bor. & turn.	23.00 to 24.00
No. 1 cupola cast	41.00 to 42.00
Hvy. breakable cast	40.00 to 41.00
Cast. charging box	40.00 to 41.00
Clean auto cast	41.00 to 42.00
Hvy. axle forge turn.	30.50 to 31.50
Low. phos. plate	33.50 to 34.50
Low phos. punchings	33.50 to 34.50
RR. steel wheels	34.00 to 35.00
RR. coil springs	34.00 to 35.00
RR. malleable	35.00 to 40.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	$28.25 to $28.75
Bundled sheets	28.25 to 28.75
Mach. shop turn.	23.25 to 23.75
Locomotive tires, uncut	30.00 to 31.00
Misc. std. sec. rails	32.00 to 34.00
Rerolling rails	39.00 to 40.00
Steel angle bars	33.00 to 35.00
Rails 3 ft. and under	35.00 to 36.00
RR. springs	32.50 to 33.50
Steel car axles	30.00 to 31.00
Stove plate	32.00 to 33.00
Grate bars	30.00 to 32.50
Brake shoes	32.00 to 33.00
Malleable	40.00 to 42.00
Cast iron carwheels	35.00 to 36.00
No. 1 machinery cast	36.00 to 38.00
Breakable cast	25.00 to 27.50

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$27.00 to $27.50
No. 2 hvy. melting	27.00 to 27.50
No. 2 bundles	27.00 to 27.50
No. 1 busheling	27.00 to 27.50
Long turnings	17.00 to 18.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	17.00 to 18.00
Bar crops and plate	28.00 to 29.00
Structural and plate	28.00 to 29.00
No. 1 cast	34.00 to 35.00
Stove plate	30.00 to 35.00
Steel axles	29.00 to 30.00
Scrap rails	28.00 to 29.00
Rerolling rails	30.00 to 31.00
Angles & splice bars	30.00 to 31.00
Rails 3 ft & under	31.00 to 32.00
Cast iron carwheels	29.50 to 30.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$32.00 to $32.50
No. 2 hvy. melting	32.00 to 32.50
Low phos. plate	34.00 to 34.50
No. 1 busheling	32.00 to 32.50
Hydraulic bundles	32.00 to 32.50
Mach. shop turn.	26.50 to 27.00
Short. shovel, turn.	26.50 to 27.00
Cast iron borings	27.00 to 27.50
Elec. furnace punch.	34.00 to 34.50

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$26.50 to $27.00
No. 2 hvy. melting	26.50 to 27.00
Comp. black bundles	26.50 to 27.00
Comp. galv. bundles	24.50 to 25.00
Mach. shop turn.	20.50
Mixed bor. & turn.	20.50
Shoveling turn.	22.50
No. 1 cupola cast	$36.00 to 37.00
Hvy. breakable cast	32.00 to 35.00
Charging box cast	$36.00 to $37.00
Stove plate	36.00 to 37.00
Clean auto cast	36.00 to 37.00
Unstrip. motor blks.	25.00 to 27.00
Cl'n chem. cast bor.	23.00 to 24.00

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$28.50 to $29.00
No. 1 bundles	28.50 to 29.00
No. 2 bundles	28.50 to 29.00
No. 2 hvy. melting	28.50 to 29.00
Mach. shop turn.	18.75 to 19.25
Shoveling turn.	20.75 to 21.25
Cast iron borings	19.75 to 20.25
Mixed bor. & turn.	18.75 to 19.25
No. 1 cupola cast	35.00 to 40.00
Charging box cast	30.00
Stove plate	30.00 to 35.00
Clean auto cast	35.00 to 40.00
Malleable	33.00 to 33.50
Low. phos. plate	31.00 to 32.00
Scrap rails	29.75 to 30.25
Rails 3 ft. & under	31.75 to 32.25
RR. steel wheels	32.75 to 33.25
Cast iron carwheels	31.00 to 31.50
RR. coil & leaf spgs.	32.75 to 33.25
RR. knuckles & coup.	32.75 to 33.25
No. 1 busheling	28.50 to 29.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$30.00 to $30.50
No. 2 hvy. melting	30.00 to 30.50
Compressed sheet stl.	30.00 to 30.50
Drop forge flashings	30.00 to 30.50
No. 2 bundles	30.00 to 30.50
Mach. shop turn.	25.00 to 25.50
Short shovel	25.00 to 25.50
No. 1 busheling	30.00 to 30.50
Steel axle turn.	30.00 to 30.50
Cast iron borings	25.00 to 25.50
Mixed bor. & turn.	25.00 to 25.50
No. 1 machinery cast	37.50 to 40.00
Malleable	34.50 to 35.00
Railroad cast	37.50 to 40.00
Railroad grate bars	30.00 to 30.50
Stove plate	34.50 to 35.00
RR. hvy. melting	30.00 to 30.50
Rails 3 ft. & under	34.00 to 34.50
Rails 18 in. & under	36.00 to 36.50
Rails for rerolling	33.00 to 33.50
Elec. furnace punch	32.00 to 32.50

SAN FRANCISCO

Per gross ton delivered to consumer:
Cast grade f.o.b. shipping point

No. 1 hvy. melting	$19.50
No. 2 hvy. melting	19.50
No. 2 bales	19.50
No. 3 bales	16.00
Mach. shop turn.	13.00
Elec. furn. 1 ft. und.	19.50*
No. 1 cupola cast.	32.00
RR. hvy. melting	20.50

LOS ANGELES

Per gross ton delivered to consumer:
Cast grade f.o.b. shipping point

No. 1 hvy. melting	$19.50
No. 2 hvy. melting	19.50
No. 1 bales	19.50
No. 2 bales	19.50
No. 3 bales	16.00
Mach. shop turn.	13.00
No. 1 cupola cast	25.00
RR. hvy. melting	20.50

SEATTLE

Per gross ton delivered to consumer:
Cast grade f.o.b. shipping point

No. 1 & No. 2 hvy. melting	$19.00
Elec. furn. 1 ft. und.	19.00
No. 1 cupola cast	25.00*
RR. hvy. melting	20.00

HAMILTON, ONT.

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

Heavy melting	$17.50*
No. 1 bundles	17.50*
No. 2 bundles	17.00*
Mixed steel scrap	15.50*
Rails, remelting	18.50*
Rails, rerolling	21.50*
Bushelings	13.00*
Mixed borings & turnings	12.50*
Electric furnace bundles	20.50*
Manganese steel scrap	20.00*
No. 1 cast	19.00*
Stove plate	17.50*
Car wheels, cast	19.50*
Malleable iron	16.00*

Comparison of Prices . .

Advances over past week in Heavy Type, declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

Flat-Rolled Steel: (cents per pound)	Jan. 14, 1947	Jan. 7, 1947	Dec. 10, 1946	Jan. 15, 1946
Hot-rolled sheets	2.50	2.50	2.50	2.20
Cold-rolled sheets	3.20	3.20	3.20	3.05
Galvanized sheets (10 ga.)	3.55	3.55	3.55	3.70
Hot-rolled strip	2.50	2.50	2.50	2.10
Cold-rolled strip	3.20	3.20	3.20	2.80
Plates	2.65	2.65	2.50	2.25
Plates, wrought iron	5.95	5.95	4.112	3.80
Stain's c-r strip (No. 302)	30.30	30.30	30.30	28.00
Tin and Terneplate: (dollars per base box)				
Tinplate, standard cokes	$5.75	$5.75	$5.00	$5.00
Tinplate, electro (0.50 lb)	5.05	5.05	4.50	4.50
Special coated mfg. ternes	4.90	4.90	4.30	4.30
Bars and Shapes: (cents per pound)				
Merchant bars	2.60	2.60	2.50	2.25
Cold-finished bars	3.20	3.20	3.10	2.75
Alloy bars	3.05	3.05	2.92	2.70
Structural shapes	2.50	2.50	2.35	2.10
Stainless bars (No. 302)	25.97	25.97	25.97	24.00
Wrought iron bars	6.15	6.15	4.76	4.40
Wire and Wire Products: (cents per pound)				
Bright wire	3.30	3.30	3.05	2.75
Wire nails	3.75	3.75	3.75	2.90
Rails: (dollars per 100 lb)				
Heavy rails	$2.50	$2.50	$43.39†	$43.00*
Light rails	2.85	2.85	49.18†	45.00*
Semifinished Steel: (dollars per gross ton)				
Rerolling billets	$42.00	$42.00	$39.00	$36.00
Sheet bars	50.00	38.00	38.00	36.00
Slabs, rerolling	42.00	42.00	39.00	36.00
Forging billets	50.00	50.00	47.00	42.00
Alloy blooms, billets, slabs	61.00	61.00	58.43	54.00
Wire Rods and Skelp: (cents per pound)				
Wire rods	2.55	2.55	2.30	2.15
Skelp	2.35	2.05	2.05	1.90

*per gross ton †per net ton

Pig Iron: (per gross ton)	Jan. 14, 1947	Jan. 7, 1947	Dec. 10, 1946	Jan. 15, 1946
No. 2, foundry, Phila.	$32.43	$32.43	$32.43	$27.59
No. 2, Valley furnace	30.50	30.50	30.50	25.75
No. 2, Southern, Cin'ti	31.75	31.75	29.80	26.19
No. 2, Birmingham	26.88	26.88	26.88	22.13
No. 2, foundry, Chicago†	30.50	30.50	30.50	25.75
Basic, del'd eastern Pa.	31.93	31.93	31.93	27.09
Basic, Valley furnace	30.00	30.00	30.00	25.25
Malleable, Chicago†	30.50	30.50	30.50	25.75
Malleable, Valley	30.50	30.50	30.50	25.75
Charcoal, Chicago	42.99	42.99	42.34	42.34
Ferromanganese‡	135.00	135.00	135.00	135.00
Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$32.25	$32.25	$25.25	$20.00
Heavy melt'g steel, Phila.	31.00	31.00	24.50	18.75
Heavy melt'g steel, Ch'go	29.75	29.75	25.25	18.75
No. 1, hy. comp. sheet, Det.	27.00	27.00	22.32	17.32
Low phos. plate, Youngs'n	34.25	34.25	27.75	22.50
No. 1, cast, Pittsburgh	40.38	40.38	34.50	20.00
No. 1, cast, Philadelphia	41.50	41.50	40.50	20.00
No. 1, cast, Chicago	42.50	42.50	39.75	20.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$8.75	$8.75	$8.75	$7.50
Foundry coke, prompt	8.50	8.50	8.50	9.00
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro., Conn.	19.50	19.50	19.50	12.00
Copper, Lake, Conn.	19.625	19.625	19.625	12.00
Tin, Straits, New York	70.00	70.00	70.00	52.00
Zinc, East St. Louis	10.50	10.50	10.50	8.25
Lead, St. Louis	12.80	12.80	11.65	6.35
Aluminum, virgin	15.00	15.00	15.00	15.00
Nickel, electrolytic	37.67	37.67		35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	28.25	28.25	23.50	14.50

†The switching charge for delivery to foundries in the Chicago district is 60¢ per ton.
‡For carlots at seaboard.

Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942 and 1943. See explanation of the change on p. 20 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite prices for the current quarter are an estimate based on finished steel shipments for the previous quarter. These figures will be revised when the actual data of shipments for this quarter are compiled.

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Jan. 14, 1947	2.87255¢ per lb.	$30.14 per gross ton.	$31.00 per gross ton.
One week ago	2.87255¢ per lb.	$30.14 per gross ton.	$31.00 per gross ton.
One month ago	2.72122¢ per lb.	$30.14 per gross ton.	$25.00 per gross ton.
One year ago	2.54490¢ per lb.	$25.37 per gross ton.	$19.17 per gross ton.

	HIGH	LOW
1947	2.87255¢	2.87255¢
1946	2.83599¢ Dec. 31	2.54490¢ Jan. 1
1945	2.44104¢ Oct. 2	2.38444¢ Jan. 2
1944	2.30837¢ Sept. 5	2.21189¢ Oct. 5
1943	2.29176¢	2.29176¢
1942	2.28249¢	2.28249¢
1941	2.43078¢	2.43078¢
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16
1939	2.35367¢ Jan. 3	2.26689¢ May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2
1933	1.95578¢ Oct. 3	1.75836¢ May 2
1932	1.89196¢ July 5	1.83901¢ Mar. 1
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29
1930	2.25488¢ Jan. 7	1.97319¢ Dec. 9
1929	2.31773¢ May 28	2.26498¢ Oct. 29

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 pct of the United States output. Index recapitulated in Aug. 28, 1941, issue.

	HIGH	LOW
1947	$30.14	$30.14
1946	$30.14 Dec. 10	$25.37 Jan. 1
1945	25.37 Oct. 23	23.61 Jan. 2
1944	$23.61	$23.61
1943	23.61	23.61
1942	23.61	23.61
1941	$23.61 Mar. 20	$23.45 Jan. 2
1940	23.45 Dec. 23	22.61 Jan. 2
1939	22.61 Sept. 19	20.61 Sept. 12
1938	23.25 June 21	19.61 July 6
1937	23.25 Mar. 9	20.25 Feb. 16
1936	19.74 Nov. 24	18.73 Aug. 11
1935	18.84 Nov. 5	17.83 May 14
1934	17.90 May 1	16.90 Jan. 27
1933	16.90 Dec. 5	13.56 Jan. 3
1932	14.81 Jan. 5	13.56 Dec. 6
1931	15.90 Jan. 6	14.79 Dec. 15
1930	18.21 Jan. 7	15.90 Dec. 16
1929	18.71 May 14	18.21 Dec. 17

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	HIGH	LOW
1947	$31.00	$31.00
1946	$31.17 Dec. 24	$19.17 Jan. 1
1945	19.17 Jan. 2	18.92 May 22
1944	19.17 Jan. 11	15.76 Oct. 24
1943	$19.17	$19.17
1942	19.17	19.17
1941	$22.00 Jan. 7	$19.17 Apr. 10
1940	21.83 Dec. 30	16.04 Apr. 9
1939	22.50 Oct. 3	14.08 May 16
1938	15.00 Nov. 22	11.00 June 7
1937	21.92 Mar. 30	12.67 June 9
1936	17.75 Dec. 21	12.67 June 8
1935	13.42 Dec. 10	10.33 Apr. 29
1934	13.00 Mar. 13	9.50 Sept. 25
1933	12.25 Aug. 8	6.75 Jan. 3
1932	8.50 Jan. 12	6.43 July 5
1931	11.33 Jan. 6	8.50 Dec. 29
1930	15.00 Feb. 18	11.25 Dec. 9
1929	17.58 Jan. 29	14.08 Dec. 3

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia, and Chicago.

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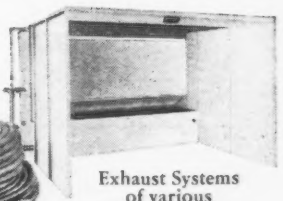

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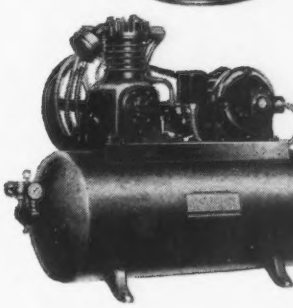

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Iron and Steel Prices . . .

Steel prices shown here are f.o.b. basing points in cents per pound or dollars per gross ton. Extras apply. Delivered prices do not reflect 3 pct tax on freight. Industry practice has discontinued arbitrary f.o.b. prices at Gulf and Pacific Ports. Space limitations prevent quotation of delivered prices at major ports. (1) Commercial quality sheet grade; primes, 25¢ above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25¢ per 100 lb to fabricators. (8) Also shafting. For quantities of 20,000 lb to 39,999 lb. (9) Carload lot in manufacturing trade. (10) This base price for annealed, bright finish wires, commercial spring wire. (11) Boxed. (12) Produced to dimensional tolerances in AISI Manual Sect. 6. (13) Billets only.

Basing Points	Pitts-burgh	Chicago	Gary	Cleve-land	Birm-ingham	Buffalo	Youngs-town	Spar-rows Point	Granite City	Middle-town, Ohio			DELIVERED TO Detroit	New York	Phila-delphia
INGOTS															
Carbon, rerolling	($35.00 f. o. b. mill)														
Carbon, forging	$40.00	$40.00	$40.00	$40.00	$40.00	$40.00	$40.00								
Alloy	$52.00	$52.00				$52.00	(Bethlehem, Massillon, Canton, Coatesville—$52.00)								
BILLETS, BLOOMS, SLABS							(Provo—$53.20, Duluth—$44.00[13])								
Carbon, rerolling	$42.00	$42.00	$42.00	$42.00	$42.00	$42.00	$42.00	$42.00					$44.50		
							(Provo—$61.20, Duluth—$52.00[13])								
Carbon, forging billets	$50.00	$50.00	$50.00	$50.00	$50.00	$50.00	$50.00						$52.50		
Alloy	$61.00	$61.00				$61.00	(Bethlehem, Massillon, Canton—$61.00)						$63.50		
SHEET BARS							$50								
PIPE SKELP	2.35¢	2.35¢					2.35¢	2.35¢	(Coatesville—2.35¢)						
WIRE RODS	2.55¢	2.55¢		2.55¢	2.55¢		(Worcester—2.65¢)								
SHEETS															
Hot-rolled	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.675¢	2.50¢			2.635¢	2.79¢	2.70¢
Cold-rolled [1]	3.20¢	3.20¢	3.20¢	3.20¢		3.20¢	3.20¢		3.30¢				3.335¢	3.61¢	3.58¢
Galvanized (10 gage)	3.55¢	3.55¢	3.55¢		3.55¢	3.55¢	3.55¢	3.55¢	3.65¢					3.84¢	3.75¢
Enameling (12 gage)	3.55¢	3.55¢	3.55¢	3.55¢			3.55¢		3.65¢				3.685¢	3.95¢	3.93¢
Long ternes [2] (10 gage)	3.55¢	3.55¢	3.55¢											3.95¢	3.91¢
STRIP															
Hot-rolled [3]	2.50¢	2.50¢	2.50¢		2.50¢		2.50¢						2.635¢	2.93¢	2.88¢
Cold-rolled [4]	3.20¢	3.30¢		3.20¢			3.20¢			(Worcester—3.75¢)			3.335¢	3.61¢	3.58¢
Cooperage stock	2.80¢	2.80¢			2.80¢		2.80¢							4.09¢	
TINPLATE															
Standard cokes, base box	$5.75	$5.75	$5.75		$5.85			$5.85	$5.85					$6.157	$6.062[11]
Electro, box 0.25 lb	Deduct 90¢ from standard coke base box price.														
Electro, box 0.50 lb	Deduct 70¢ from standard coke base box price.														
Electro, box 0.75 lb	Deduct 50¢ from standard coke base box price.														
BLACKPLATE															
29 gage [5]	3.60¢	3.60¢	3.60¢		3.70¢			3.70¢	3.70¢					3.99¢	3.90¢
TERNES, MFG.															
Special coated, base box	Deduct 85¢ from standard coke base box price.														
BARS															
Carbon steel	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	(Duluth—2.70¢) (Provo, Utah—3.30¢)					2.735¢	3.01¢	2.98¢
Rail steel [6]	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢									
Reinforcing (billet) [7]	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢					2.585¢	2.74¢	2.65¢
Reinforcing (rail) [7]	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢						2.735¢		
Cold-finished [8]	3.20¢	3.20¢	3.20¢	3.20¢		3.20¢	(Detroit—3.25¢, Toledo—3.35¢)							3.61¢	3.58¢
Alloy, hot-rolled	3.05¢	3.05¢				3.05¢	3.05¢	(Bethlehem, Massillon, Canton—3.05¢)					3.185¢		3.19¢
Alloy, cold-drawn	3.80¢	3.80¢	3.80¢	3.80¢		3.80¢							3.90¢		
PLATE								(Coatesville, Claymont—2.80¢, Geneva, Utah—2.80¢)							
Carbon steel [12]	2.65¢	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢	2.65¢					2.905¢	2.87¢	2.85¢
Floor plates	3.90¢	3.90¢												4.30¢	4.28¢
Alloy	3.79¢	3.79¢			(Coatesville—3.79¢)									4.01¢	3.895¢
SHAPES															
Structural	2.50¢	2.50¢	2.50¢		2.50¢	2.50¢	(Geneva, Utah—2.65¢) (Bethlehem—2.50¢)							2.70¢	2.64¢
SPRING STEEL, C-R															
0.26 to 0.50 carbon	3.55¢			3.55¢			(Worcester—3.75¢)								
0.51 to 0.75 carbon	4.80¢			4.80¢			(Worcester—5.00¢)								
0.76 to 1.00 carbon	6.65¢			6.65¢			(Worcester—6.85¢)								
1.01 to 1.25 carbon	8.85¢			8.85¢			(Worcester—9.05¢)								
WIRE [9]															
Bright [10]	3.30¢	3.30¢		3.30¢	3.30¢		(Worcester—3.40¢, Duluth—3.35¢)							3.71¢	3.68¢
Galvanized	Add proper size extra and galvanizing extra to Bright Wire Base														
Spring (high carbon)	4.25¢	4.25¢		4.25¢			(Worcester—4.40¢)			(Trenton—4.50¢)				4.66¢	4.345¢
PILING															
Steel sheet	3.00¢	3.00¢				3.00¢								3.41¢	3.36¢

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

BASING POINT	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila.	Subject to negotiation			Subject to negotiation		
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt.	22.99	22.07	17.01	17.47	20.69	25.29
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading	22.99	22.07	17.01	17.47	20.69	25.29
Billets, P'gh, Chi, Canton, Watervliet, Syracuse, Balt.	Subject to negotiation			Subject to negotiation		
Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Watervliet, Syracuse, Ft. Wayne, Titusville	22.99	22.07	17.01	17.47	20.69	25.29
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville	27.05	25.97	20.02	20.56	24.34	29.75
Bars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Syracuse, Balt, Phila, Reading Ft. Wayne, Watervliet	27.05	25.97	20.02	20.56	24.34	29.75
Plates, P'gh, Middletown, Canton	31.38	29.21	23.28	23.80	28.67	33.00
Shapes, structural, P'gh, Chi	27.05	25.97	20.02	20.56	24.34	29.75
Sheets, P'gh, Chi, Middletown, Canton, Balt.	38.95	36.79	28.67	31.38	35.16	38.49
Strip h-r, P'gh, Chi, Reading, Canton, Youngstown	25.43	23.28	18.39	18.93	25.97	37.87
Strip, c-r, P'gh, Cleve, Newark, N. J., Reading, Canton, Youngstown	32.46	30.30	23.80	24.34	34.62	56.26
Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila.	27.05	25.97	20.02	20.56	24.34	29.75
Wire, flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton	32.46	30.30	23.80	24.34	34.62	56.26
Rod, h-r, Syracuse	27.05	25.97	20.02	20.56	24.34	29.75
Tubing, seamless, P'gh, Chi, Canton, (4 to 8 in.)	72.09	72.09	.....	68.49	.....	.....

TOOL STEEL

*(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk. *Also Canton, O.)*

An increase of 8.2 pct applies to base price and extras

	Base per lb
High speed	67¢
Straight molybdenum	54¢
Tungsten-molybdenum	57½¢
High-carbon-chromium*	43¢
Oil hardening*	24¢
Special carbon*	22¢
Extra carbon*	18¢
Regular carbon*	14¢

Warehouse prices on and east of Mississippi are 2¢ per lb higher; west of Mississippi 3¢ higher.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	per lb
Field grade	3.90¢
Armature	4.25¢
Electrical	4.75¢
Motor	5.425¢
Dynamo	6.125¢
Transformer 72	6.625¢
Transformer 65	7.625¢
Transformer 58	8.125¢
Transformer 52	8.925¢

F.o.b. Chicago and Gary, field grade through motor; f.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb	
No. 1 O.H., per 100 lb	$2.50
Angle splice bars, 100 lb	3.00
(F.o.b. basing points)	*per 100 lb*
Light rails (from billets)	$2.85
Light rails (from rail steel)	2.75

	Base per lb
Cut spikes	4.50¢
Screw spikes	6.40¢
Tie plate, steel	2.80¢
Tie plates, Pacific Coast	2.95¢
Track bolts	6.50¢
Track bolts, heat treated, to rail roads	6.75¢
Track bolts, jobbers discount	63-5

Basing points, light rails, Pittsburgh, Chicago, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, add 25¢.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

	20x14 in.	20x28 in.
8-lb coating I.C.	$6.75	$13.50

CLAD STEEL

Base prices, cents per pound

	Plate	Sheet
Stainless-clad		
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Coatesville, Pa.	24.00*	22.00
Nickel-clad		
10 pct, f.o.b. Coatesville, Pa.	21.50	....
Inconel-clad		
10 pct, f.o.b. Coatesville	30.00	....
Monel-clad		
10 pct, f.o.b. Coatesville	29.00	....
Aluminized steel		
Hot dip, 20 gage, f.o.b. Pittsburgh	....	9.00

*Includes annealing and pickling.

WIRE PRODUCTS

To the dealer f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Base per keg
Standard, galvanized and coated nails	$3.75
Cut nails, carloads	5.05

	Base per 100 lb
Annealed fence wire	$3.95
Annealed galv. fence wire	4.40

	Base column
Woven wire fence*	84
Fence posts, carloads	74
Single loop bale ties	86
Galvanized barbed wire**	94
Twisted barbless wire	94

*15½ gage and heavier. **On 80-rod spools in carload quantities.

HIGH TENSILE, LOW ALLOY STEELS

base prices, cents per pound

Steel	Aldecor	Corten	Double Strength No. 1	Dynalloy	HI Steel	Mayari R	Otis-coloy	Yoloy	Y-50
Producer	Republic	Carnegie-Illinois, Republic	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	American Rolling Mill
Plates	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	.....
Sheets									
Hot-rolled	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85	.....
Cold-rolled	4.75	4.75	4.75	.....	4.75	4.75	4.75	4.75	5.225*
Galvanized	.....	5.40	.....	.....	.....	5.40	.....	.....	.....
Strip									
Hot-rolled	3.85	3.85	3.85	.....	3.85	3.85	3.85	3.85	.....
Cold-rolled	.....	.....	4.75	.....	.....	4.75	4.75	4.75	5.00*
Shapes	.....	3.85	.....	.....	3.85	3.85	3.85	3.85	.....
Beams	.....	3.85	.....	.....	.....	3.85	.....	.....	.....
Bars									
Hot-rolled	4.00	4.00	4.00	.....	.....	4.00	4.00	4.00	.....
Cold-rolled	.....	.....	.....	.....	.....	.....	.....	4.60	.....
Bar shapes	.....	4.00	.....	.....	4.00	4.00	4.00	4.00	.....

* 21 gage and lighter.

WELDED PIPE AND TUBING

Base discounts, f.o.b. Pittsburgh district and Lorain, Ohio, mills

(F.o.b. Pittsburgh only on wrought pipe)
Base price—$200.00 per net ton

Steel (buttweld, standard)

	Black	Galv.
½-in.	55½	41
¾-in.	58½	45
1-in. to 3-in.	60½	47½

Wrought Iron (buttweld, standard)

½-in.	2	+20
¾-in.	11½	+10
1-in. and 1¼-in.	17	+ 2
1½-in.	22½	1½
2-in.	23	2

Steel (lapweld, standard)

2-in.	53	39½
2½-in. and 3-in.	56	42½
3½-in. to 6-in.	58	44½

Wrought Iron (lapweld)

2-in.	14½	+ 5½
2½-in. to 3½-in.	17	+ 1½
4-in.	21	4
4½-in. to 8-in.	19	2½

Steel (butt, extra strong, plain ends)

½-in.	54½	41½
¾-in.	58½	45½
1-in. to 3-in.	60	48

Wrought Iron (same as above)

½-in.	6½	+14
¾-in.	12½	+ 8
1-in. to 2-in.	22	2

Steel (lap, extra strong, plain ends)

2-in.	52	39½
2½-in and 3-in.	56	43½
3½-in. to 6-in.	59½	47

Wrought Iron (same as above)

2-in.	17½	+ 2
2½-in. to 4-in.	26	8½
4½-in. to 6-in.	22	4

Basing discounts for standard pipe and reamed and drifted pipe are for threads and couplings. For threads only, one point higher discount (lower price) applies; for plain ends, buttweld, and lapweld 3 in. and smaller, three points higher discount (lower price) applies, while for lapweld 3½ in. to 6 in., four points higher discount (lower price) applies.

BOILER TUBES

Seamless steel and lapweld commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft f.o.b. Pittsburgh, in carload lots.

	Seamless Cold-Drawn	Hot-Rolled
2 in. O.D. 13 B.W.G.	$18.17	$15.29
2½ in. O.D. 12 B.W.G.	24.43	20.57
3 in. O.D. 12 B.W.G.	27.18	22.87
3½ in. O.D. 11 B.W.G.	34.30	28.86
4 in. O.D. 10 B.W.G.	42.55	35.82

(Extras for less carload quantities)

40,000 lb or ft and over	Base
30,000 lb or ft to 39,999 lb or ft	5 pct
20,000 lb or ft to 29,999 lb or ft	10 pct
10,000 lb or ft to 19,999 lb or ft	20 pct
5,000 lb or ft to 9,999 lb or ft	30 pct
2,000 lb or ft to 4,999 lb or ft	45 pct
Under 2,000 lb or ft	65 pct

CAST IRON WATER PIPE

	Per net ton
6-in. to 24-in., del'd Chicago	$74.33
6-in. to 24-in., del'd New York	73.60
6-in. to 24-in., Birmingham	65.00
6-in. and larger, f.e.b. cars, San Francisco, Los Angeles or Seattle for all rail shipment; rail and water shipment less	88.40

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

Base discount less case lots

	Percent Off List
½ in. & smaller x 6 in. & shorter	55
9/16 & ⅝ in. x 6 in. & shorter	52
¾ to 1 in. x 6 in. & shorter	49
1⅛ in. and larger, all lengths	49
All diameters over 6 in. long	49
Lag, all sizes	50
Plow bolts	57

Nuts, Cold Punched or Hot Pressed
(Hexagon or Square)

½ in. and smaller	50
9/16 to 1 in. inclusive	49
1⅛ to 1½ in. inclusive	48
1⅝ in. and larger	46

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts	U.S.S.	S.A.E.
Base discount less case lots		
7/16 in. and smaller	..	51
½ in. and smaller	50	..
½ in. through 1 in.	..	49
9/16 in. through 1 in.	49	..
1⅛ in. through 1½ in.	48	47
1⅝ in. and larger	46	..

In full case lots, 15 pct additional discount. For 200 lb or more, freight allowed up to 50¢ per 100 lb, based on Cleveland, Chicago, Pittsburgh.

Stove Bolts

	Consumer
Packages, nuts loose	60 and 10
In packages, nuts attached	67 and 52
In bulk	74

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets
(½ in. and larger)

	Base per 100 Lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$5.25
F.o.b. Lebanon, Pa.	5.40

Small Rivets
(7/16 in. and smaller)

	Percent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	55 and 5

Cap and Set Screws *(In packages)*	Percent Off List Consumer
Upset full fin, hexagon head cap screws, coarse or fine thread, up to and incl. 1 in x 6 in.	59
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	36
Fillister head cap, listed sizes	51

Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

FLUORSPAR

Maximum price f.o.b. consumer's plant, $30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

Effective CaF_2 Content:	Base price per short ton
70% or more	$33.00
65% but less than 70%	32.00
60% but less than 65%	31.00
Less than 60%	30.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer	$5.45
Old range, non-bessemer	5.30
Mesabi, bessemer	5.20
Mesabi, non-bessemer	5.05
High phosphorus	5.05

Iron ore exempt from price control by SO 193 effective Nov. 10, 1946.

METAL POWDERS

Prices in cents per pound in ton lots, f.o.b. shipping point.

Brass, minus 100 mesh	23¢ to 27¢
Copper, electrolytic, 100 and 375 mesh	28⅝¢ to 30⅝¢
Copper, reduced, 150 and 200 mesh	22⅜¢
Iron, commercial, 100, 200, 325, mesh 96 + % Fe	11¢ to 16¢
Swedish sponge iron, 100 mesh, c.i.f. N. Y., carlots, ocean bags	7.4¢ to 8¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots	5¢
Iron, hydrogen reduced, 300 mesh and finer, 98 + % Fe, drum lots	66¢
Iron, electrolytic, unannealed, 325 mesh and coarser, 99 + % Fe	25¢ to 31¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	17¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe	90¢ to $1.75
Aluminum, 100, 200 mesh, carlots	25¢
Antimony, 100 mesh	39¢
Cadmium, 100 mesh	$2.00
Chromium, 100 mesh and finer	$1.25
Lead, 100, 200 & 300 mesh	17.55¢ to 21.05¢
Manganese, minus 325 mesh and coarser	41¢ to 61¢
Nickel, 150 mesh	51½¢
Silicon, minus 325 mesh and coarser	26¢ to 55¢
Solder powder, 100 mesh	8½¢ plus metal
Tin, 100 mesh	58¾¢
Tungsten metal powder, 98%-99%, any quantity, per lb	$2.60
Molybdenum powder, 99%, in 100-lb kegs, f.o.b. York, Pa., per lb	$2.65
Under 100 lb	$2.90

COKE

Furnace, beehive (f.o.b. oven)	Net Ton
Connellsville, Pa.	$8.75
Connellsville, Pa., hand drawn	9.35
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	8.50
Foundry, Byproduct	
Chicago, del'd	15.10
Chicago, f.o.b.	14.35
New England, del'd	16.04
Kearny, N. J., f.o.b.	14.40
Philadelphia, del'd	14.62
Buffalo, del'd	14.75
Portsmouth, Ohio, f.o.b.	12.85
Painesville, Ohio, f.o.b.	13.50
Erie, del'd	14.50
Cleveland, del'd	14.55
Cincinnati, del'd	14.60
St. Louis, del'd	15.10†
Birmingham, del'd	12.25

†Except producers situated in states other than Missouri, Alabama or Tennessee, sellers may charge a maximum delivered price of $15.60 in the St. Louis Mo., and East St. Louis, Ill., switching districts.

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

	Carloads Per 1000
Sec. quality, Ohio	57.00
First quality, Pa., Md., Ky., Mo., Ill., Ohio	65.00
First quality, New Jersey	70.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	59.00
Sec. quality, New Jersey	62.00
Sec. quality, Ohio	57.00
Ground fire clay, net ton, bulk	9.50

Silica Brick

Pennsylvania and Birmingham	$65.00
Chicago District	74.00
Silica cement, net ton (Eastern)	11.50
Chicago	12.50

Chrome Brick	Per Net Ton
Standard chemically bonded, Balt., Plymouth Meeting, Chester	$54.00

Magnesite Brick

Standard, Balt. and Chester	$76.00
Chemically bonded, Baltimore	65.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester in sacks	$44.50
Domestic, f.o.b. Chewelah, Wash., in bulk	22.00
in sacks	26.00
Clinker (dead burned) dolomite, bulk, per net ton, f.o.b. York, Pa.	10.05
Midwest, add 10¢; Mo. Valley, add 20¢	

WAREHOUSE PRICES

Delivered metropolitan areas, per 100 lb. Prices do not reflect recent price increases or the ICC approved freight rate increases effective Jan. 1.

Cities	SHEETS			STRIP			Plates ¼ in. and heavier	Structural Shapes	BARS		ALLOY BARS			
				Hot-Rolled										
	Hot-Rolled (10 gage)	Cold-Rolled	Galvanized (24 gage)	6 in. and Under	Over 6 in.	Cold-Rolled			Hot-Rolled	Cold-Finished	Hot-Rolled, A-8617-20	Hot-Rolled, A-8742-50 Ann.	Cold-Drawn, A-8617-20	Cold-Drawn, A-8742-50 Ann.
**Philadelphia	$3.774	$5.139	$5.249[a]	$4.314	$4.214	$5.064	$3.875	$3.937	$4.114	$4.564	$6.287	$7.387	$7.664	$8.764
New York	3.856	4.869	5.501	4.375	4.275	5.075	4.049	4.038	4.134	4.584	6.338	7.438	7.684	8.784
Boston	4.05	5.031	5.725	4.518	4.418	4.985	4.203	4.023	4.356	4.656	6.503	7.603	7.756	8.856
Baltimore	3.64	5.118	5.365	4.293	4.193	....	3.865	4.05	4.093	4.543	....	....	....	....
Norfolk	4.037	....	5.862	4.577	4.477	....	4.262	4.303	4.377	4.677	....	....	....	....
Chicago	3.475	4.425	5.40	3.95	3.85	4.90[5]	3.80	....	3.75	4.20	6.05	7.15	7.20	8.30
Milwaukee	3.633	4.583	5.558	4.108	4.008	5.058[5]	3.958	3.958	3.908	4.358	6.308	7.408	7.458	8.558
Cleveland	3.575	....	5.347	3.95	3.85	....	3.65	3.88	3.80	4.20	6.277	7.377	7.20	8.30
Buffalo	3.575	4.625	5.20	4.211	4.111	4.961	3.921	3.85	3.80	4.20	6.05	7.15	7.20	8.30
Detroit	3.71	4.76	5.526	4.085	3.985	4.95	3.935	3.987	3.735	4.285	6.456	7.556	7.585	8.685
Cincinnati	3.671	4.721	5.296	4.046	3.946	5.002	3.952	3.983	3.902	4.502	6.441	7.541	7.602	8.702
St. Louis	3.643	4.593	5.622	4.118	4.018	5.222	3.968	3.988	3.918	4.522	6.472	7.572	7.622	8.722
Pittsburgh	3.575	4.625	5.20	3.95	3.85	4.70	3.65	3.65	3.60	4.20	6.05	7.15	7.20	8.30
St. Paul	3.817	4.767	5.666	4.292	4.192	5.000	4.142	4.142	4.092	4.852	....	6.322	7.952	8.052
Duluth	3.817	4.767	5.666	4.292	4.192	....	4.142	4.142	4.092	....	6.472	6.572	....	....
Omaha	4.045	5.72	6.00	4.52	4.42	....	4.37	4.37	4.32	4.945	....	....	....	....
Indianapolis	3.775	4.825	5.40	4.15	4.05	5.03	3.92	3.92	3.87	4.47	6.17	....	7.32	....
Birmingham	3.675	....	5.20	4.05	3.95	....	3.80	3.80	3.75	4.954	6.414	7.514	7.564	8.614
Memphis	4.221	....	5.748	4.596	4.496	....	4.346	4.346	4.296	4.821	....	....	....	....
New Orleans	4.359[e]	5.401	5.884	4.734	4.634	....	4.484	4.484[e]	4.434[e]	5.175	....	....	....	....
Los Angeles	4.885	6.635[1]	5.585	5.335	5.235	....	4.835	4.735	4.685	6.065	....	....	....	....
San Francisco	4.435	6.035	6.585	4.885	4.785	....	4.535	4.385	4.435	5.815	....	....	....	....
Seattle	4.905[4]	7.305[2]	6.435	4.635	4.535	....	5.035[4]	4.735[4]	4.635[4]	6.285	7.735[6]	8.735[6]	....	9.585[6]
Portland	4.905[3]	....	6.235	5.135	....	....	5.035[3]	4.735[3]	4.735[3]	6.015	7.735	8.885	....	....
Salt Lake City	4.81	....	6.70	5.94	5.84	....	5.29	5.29	5.19	6.49	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb; strip, extras on all quantities; bars, 1500 lb base.

ALLOY BARS: 1000 to 39,999 lb.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 10,000 lb; (5) 2000 lb and over; (6) 1000 lb and over.

(a) Philadelphia: Galvanized sheet, 25 or more bundles.

* Add 29.1¢ for sizes not rolled in Birmingham.

** City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums.

BASING POINT PRICES

Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	31.00	31.50	32.00	32.50	....
Birdsboro	31.00	31.50	32.00	32.50	38.00
Birmingham	26.38	26.88	....	....	....
Buffalo	30.00	30.50	31.00	31.50	....
Chicago	30.00	30.50	30.50	31.00	....
Cleveland	30.00	30.50	30.50	31.00	....
Detroit	30.00	30.50	30.50	31.00	....
Duluth	30.50	31.00	31.00	31.50	....
Erie	30.00	30.50	31.00	31.50	....
Everett	29.00	29.50	30.00	30.50	....
Granite City	30.00	30.50	30.50	31.00	....
Neville Island	30.00	30.50	30.50	31.00	....
Provo	30.00	30.50	....	....	....
Sharpsville	30.00	30.50	30.50	31.00	....
Steelton	31.00	31.50	32.00	32.50	36.00
Swedeland	31.00	31.50	32.00	32.50	....
Toledo	30.00	30.50	30.50	31.00	....
Youngstown[1]	30.00	30.50	30.50	31.00	....

DELIVERED PRICES† (BASE GRADES)

Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$0.50 Arb.	29.50	30.00	30.50	31.00	....
Boston	Birdsboro-Steelton	4.82	....	....	....	....	40.82
Brooklyn	Bethlehem	3.00	34.00	34.50	35.00	35.50	....
Brooklyn	Birdsboro	3.50	....	....	....	....	39.50
Canton	Clev., Ygstn., Sharpsville	1.67	31.67	32.17	32.17	32.67	....
Cincinnati	Birmingham	4.57	31.25	31.75	....	....	....
Jersey City	Bethlehem	1.84	32.84	33.34	33.84	34.34	....
Jersey City	Birdsboro	2.33	....	....	....	....	38.33
Los Angeles	Provo	5.94	35.94	36.44	....	....	....
Mansfield	Cleveland-Toledo	2.33	32.33	32.83	32.83	33.33	....
Philadelphia	Swedeland	1.01	32.01	32.51	33.01	33.51	....
Philadelphia	Birdsboro	1.49	....	....	....	....	37.49
San Francisco	Provo	5.94	35.94	36.44	....	....	....
Seattle	Provo	5.94	35.94	36.44	....	....	....
St. Louis	Granite City	0.50 Arb.	30.50	31.00	31.00	31.50	....

(1) Struthers Iron & Steel Co., Struthers, Ohio, charges 50¢ per ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Charcoal pig iron base price for low phosphorous $37.50 per gross ton, f.o.b. Lyles, Tenn. Delivered to Chicago, $42.99. High phosphorous charcoal pig iron is not being produced.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson Ohio—$36.00; f.o.b. Buffalo—$37.25. Add $1.00 per ton for each additional 0.50 pct Si. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.

Carload lots (bulk)	$135.00
Less ton lots (packed)	148.50
F.o.b. Pittsburgh	139.50

$1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

Briquets—cents per pound of briquet, freight allowed, 66% contained Mn.

	Eastern	Central	Western
Carload, bulk	6.40	6.65	7.20
Ton lots	7.30	7.90	9.80
Less ton lots	7.70	8.30	10.20

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$39.00	$40.00
F.o.b. Pittsburgh, Chicago	44.00	

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, f.o.b. shipping point, freight allowed, eastern zone.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	30
L.c.l. lots	32

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	32
Ton lots	34
Less ton lots	36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

	Carloads	Ton	Less
0.10% max. C, 0.06% P, 90% Mn	21.00	21.40	21.65
0.10% max. C	20.50	20.90	21.15
0.15% max. C	20.00	20.40	20.65
0.30% max. C	19.50	19.90	20.15
0.50% max. C	19.00	19.40	19.65
0.75% max. C, 7.00% max. Si	16.00	16.40	16.65

Silicomanganese

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed. 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.45
Ton lots	7.40
Briquet, contract basis, carlots, bulk freight allowed, per lb of briquet	6.15
Ton lots	7.05
Less ton lots	7.45

Silvery Iron (electric furnace)

Si 14.01 to 14.50%, $53.25 f.o.b. Keokuk, Iowa; $50.00 f.o.b. Jackson, Ohio; $51.25 f.o.b. Niagara Falls. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 per ton for low impurities, not to exceed: P—0.05%, S—0.04%, C—1.00%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots packed.

	Eastern	Central	Western
96% Si, 2% Fe	14.65	16.90	18.65
97% Si, 1% Fe	15.05	17.30	19.05

Ferrosilicon Briquets

Contract price, cents per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination, 40% Si. 1 lb briquets.

	Eastern	Central	Western
Carload, bulk	3.85	4.10	4.30
Ton lots	4.75	5.35	5.65
Less ton lots	5.15	5.75	6.05

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
50% Si	7.45	7.95	8.15
75% Si	9.25	9.55	10.30
80-90% Si	10.45	10.75	11.50
90-95% Si	12.05	12.35	13.05

Ferrochrome (65-72% Cr, 2% max. Si)

Contract prices, cents per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
0.06% C	23.00	23.40	24.00
0.10% C	22.50	22.90	23.50
0.15% C	22.00	22.40	23.00
0.20% C	21.50	21.90	22.50
0.50% C	21.00	21.40	22.00
1.00% C	20.50	20.90	21.50
2.00% C	19.50	19.90	20.50
65-69% Cr, 4-9% C	15.60	16.00	16.15
62-66% Cr, 4-6% C, 6-9% Si	16.60	17.00	17.15

Briquets—contract price, cents per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.

	Eastern	Central	Western
Carload, bulk	9.85	10.10	10.20
Ton lots	10.75	11.65	12.25
Less ton lots	11.15	12.05	12.65

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

	Eastern	Central	Western
Carload	16.70	17.10	17.25
Ton lots	17.90	19.20	20.00
Less ton lots	18.60	19.90	20.70

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

	Eastern	Central	Western
Carload	20.00	20.40	21.00
Ton lots	21.00	21.65	22.85
Less ton lots	22.00	22.65	23.85

Chromium Metal

Contract prices, cents per lb, chromium contained, carload, f.o.b. shipping point, freight allowed. 97% min. Cr, 1% max. Fe.

	Eastern	Central	Western
0.20% max. C	83.50	85.00	86.25
0.50% max. C	79.50	81.00	82.25
9.00% min. C	79.50	81.00	82.25

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

30-35% Ca, 60-65% Si, 3.00% max. Fe or 28-32% Ca, 60-65% Si, 6.00% max. Fe.

	Eastern	Central	Western
Carloads	13.00	13.50	15.55
Ton lots	14.50	15.25	17.40
Less ton lots	15.50	16.25	18.40

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight allowed.

16-20% Ca, 14-18% Mn, 53-59% Si.

	Eastern	Central	Western
Carloads	15.50	16.00	18.05
Ton lots	16.50	17.35	19.10
Less ton lots	17.00	17.85	19.60

Calcium Metal

Eastern zone contract prices, cents per pound of metal, f.o.b. shipping point, freight allowed. Add 1.5¢ for central zone; 3.5¢ for western zone.

	Cast Turnings	Distilled
Ton lots	$1.60	$2.35	$2.95
Less ton lots	1.95	2.70	3.75

CMSZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

	Eastern	Central	Western
Ton lots	13.50	14.60	16.55
Less ton lots	14.25	15.35	17.30

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	13.25	14.35	16.30
Less ton lots	14.00	15.10	17.05

SMZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe.

	Eastern	Central	Western
Ton lots	13.25	14.35	16.30
Less ton lots	14.00	15.10	17.05

Other Ferroalloys

Ferrotungsten, standard, lump or ½X down, packed, f.o.b. plant Niagara Falls, Washington, Pa., York, Pa., per pound contained T, 5 ton lots, freight allowed	$1.88
Ferrovanadium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V.	
Openhearth	$2.70
Crucible	$2.80
High speed steel (Primos)	$2.90
Vanadium pentoxide, 88-92% V_2O_5 technical grade, contract basis, per pound contained V_2O_5	$1.10
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb.	
Ton lots	$2.50
Less ton lots	$2.55
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo	95¢
Calcium molybdate, 40-45%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo	80¢
Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo	80¢
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo	80¢
Ferrotitanium, 40-45%, 0.10%C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti	$1.23
Less ton lots	$1.25
Ferrotitanium, 20-25%, 0.10%C max., ton lots, per pound contained Ti	$1.35
Less ton lots	$1.40
High carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads, per net ton	$142.50
Ferrophosphorus, 18%, electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with $3 unitage freight equalled with Rockdale, Tenn., per gross ton	$58.50
Ferrophosphorus, Electrolytic, 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage freight equalized with Nashville, per gross ton	$75.00
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Carload lots	14.50¢
Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy	
Carload, bulk	4.85¢
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Niagara Falls, carload	6.25¢
Ton lots	6.75¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Car lots	8.50¢
Ton lots	9.25¢
Less ton lots	9.75¢

Boron Agents

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed. Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

	Eastern	Central	Western
Less ton lots	$1.30	$1.3075	$1.329

Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

Ton lots	$1.89	$1.903	$1.935
Less ton lots	2.01	2.023	2.055

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

Less ton lots	$2.10	$2.1125	$2.1445

Silcaz, contract basis, f.o.b. plant freight allowed, per pound of alloy.

Carload lots	35¢
Ton lots	37¢

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over.

No. 1	87.5¢
No. 6	60¢
No. 79	45¢

Bortram, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Imports of Canadian Aluminum Growing

Ottawa

• • • **Canada's exports** of aluminum ingots rose sharply in November to total 48,000 tons, an increase of 42,000 tons or 80 pct over exports for October and were only 2000 tons below August's record level of 50,000 tons, according to the Dominion Bureau of Statistics. The most significant feature was a large increase in exports to the United States by Aluminum Co. of Canada Ltd., when 11,000 tons of bars, blocks, blooms and ingots were exported to that country, bringing total exports to the U. S. in the first eleven months of the year to 36,000 tons.

The United Kingdom, however, continued the largest buyer from Aluminum Co. of Canada, taking 24,000 tons in November. In the 11 months of 1946, the United Kingdom took 46.8 pct of the total 174,000-ton export business of Aluminum Co. of Canada. In addition to the big tonnage exports to the United Kingdom and the United States, Aluminum Co. of Canada has broadened its business in the export markets of the world.

The principal outlets for Canadian aluminum ingots for November and the 11 months of 1946, in short tons, follow:

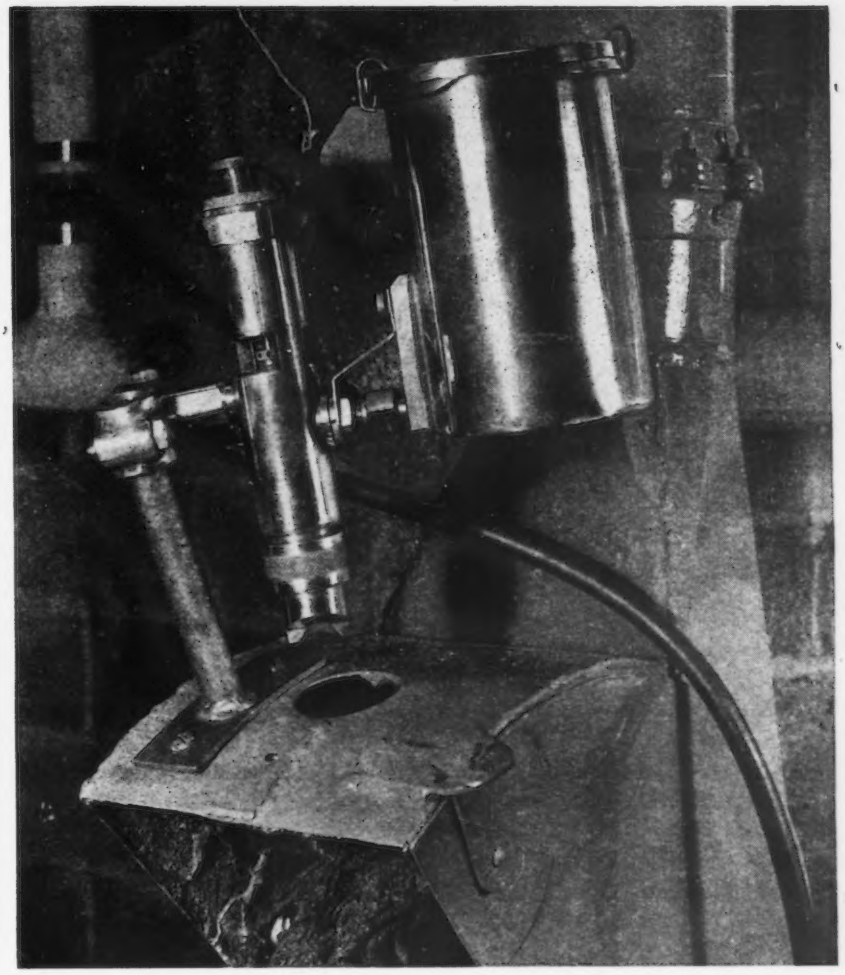
Country	*November*	*Jan.-Nov.*
United Kingdom ...	24,433	81,500
United States	11,015	36,021
Czechoslovakia	5,998	12,480
Switzerland	.....	8,008
India	.....	7,311
France	2,624	6,104
Miscellaneous	4,192	22,838
Total	48,262	174,262

British Steel Prices Up

London

• • • **Maximum price increases** amounting to about 5 pct have been announced by the British Ministry of Supply on a list of special finished steel products. Principal items affected are wire rope, brake cable, and tinned steel wire.

A revised extra schedule for high carbon cold-rolled strip will have the effect of raising the maximum price for this item as well. The new prices became effective on January 1, 1947.



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NU-SPRA-GLU is a LIQUID GLUE and ABRASIVE mixture that can be sprayed to a revolving wheel. Introduced 18 months ago, it has been widely used for producing satin finish on nearly all types of metals. NU-SPRA-GLU replaces greaseless compound, and represents a new step in buffing development. It works most efficiently, produces excellent results, does not go down the blower or on the floor, and *lasts longer on the wheel.* NU-SPRA-GLU can be supplied in all sizes from 120 to 600.

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For Mirror Finish . . .

BUFFING NU-SPRA-GLU is a LIQUID GREASE and ABRASIVE mixture that can be sprayed to a revolving wheel. On the market only a year and a half, BUFFING NU-SPRA-GLU has been used successfully to replace bar compounds. It gives dividends four ways: it imparts a mirror finish to the metal; it saves 70% of the compound; it gives a 30% saving of buffs; it eliminates injury to buffers.

Tell us about your buffing and polishing problems. We are in a position to help you, and our engineers are conveniently located for free consultation.

**Patent on method has been applied for.*

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Mn	60%
SiO_2	8%
Al_2O_3	0.76%
Fe	3.1%
P	0.06%

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Warns New Interstate Highway Program Not Adequate for Future

Los Angeles

• • • **In a paper presented** at the annual meeting of the American Assn. of State Highway Officials here recently, Prof. John S. Worley, author, engineer and analyst of highway problems, warned that the giant Interstate Highway System programmed by the federal and state governments for the next few years "should be constructed to serve the developed and expanded conditions of 50 to 75 yr hence, rather than the traffic of the two immediate decades."

"National and state policies," Dr. Worley emphasized, "should be to meet potential future needs with respect to any contemplated highway system, rather than to effect current pecuniary savings;" for the system, once built, "will fix the pattern of highway transport for 75 to 100 yr, and possibly for all time."

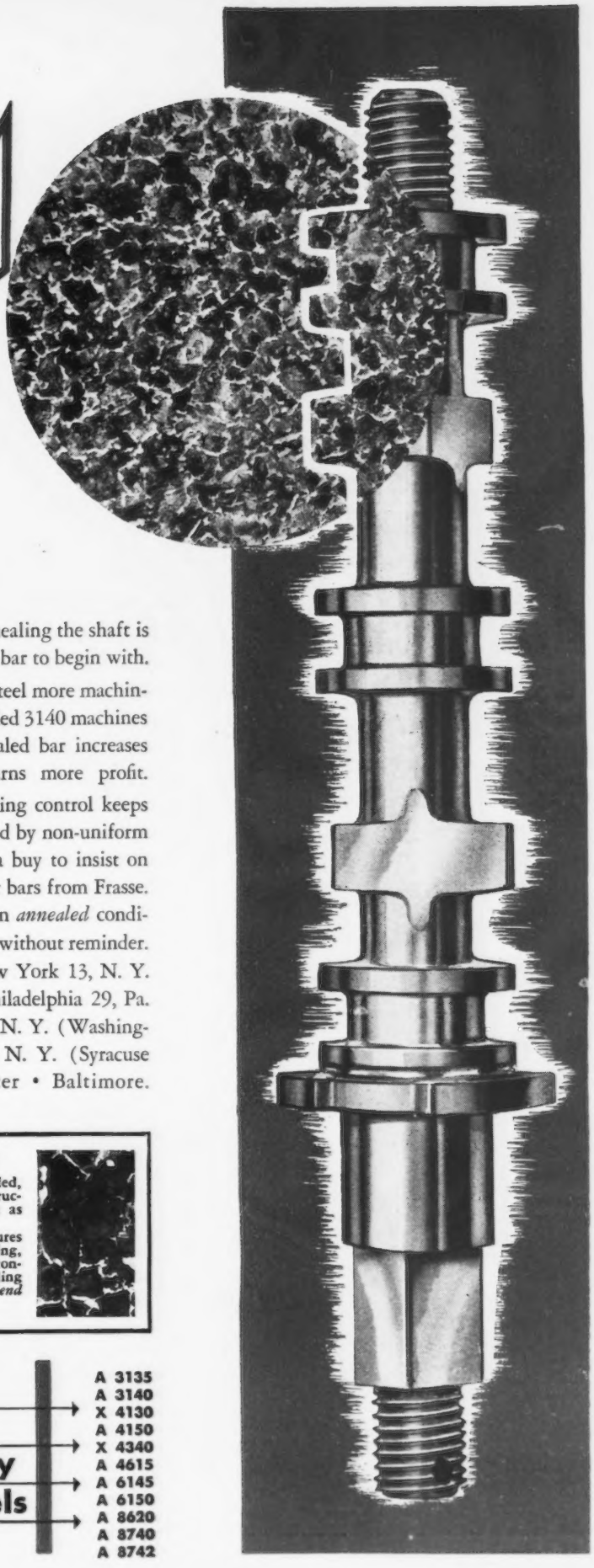
Dr. Worley, who is a faculty member of the Engineering College, University of Michigan, himself, has concluded in a two and one-half year study on which the paper was based, it was indicated, that large vehicles bearing heavy loads do not appreciably damage highway pavements provided the gross weight is cushioned and supported by multiple axles.

Thus, according to the paper, "all experiments and investigations made since the first road test of the Public Roads Administration in 1925 show that dual axles, each loaded to the full legal limit of a single axle, will do no more injury to the pavement than a single axle, bridges of course excepted."

"From this," Dr. Worley said, "it is reasonable to infer that 10 or 100 axles spaced 42 in. apart (the spacing favored by many authorities), and each carrying the legal load for a single axle, would not injure the pavement. This is the conclusion of some of those who have studied the subject and is recognized as correct by the Public Roads Administration."

In somewhat simpler terms, the paper added: "The loading for each of dual or multiple axles, when properly spaced, can be the same as the legal load of a single axle without injury to the paving

the hidden bargain in alloy steel



This camshaft is cut from alloy bar stock. Cost of annealing the shaft is less than ¼ of a cent—because it's cut from *annealed* bar to begin with.

See the rest of this bargain! Annealing makes the steel more machinable . . . and easier on the tools, too. In this case, annealed 3140 machines 14% faster than the same grade "as rolled". Annealed bar increases production, prolongs life of expensive tools, earns more profit.

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For the Technical Minded:

Both photomicrographs (x 100) are hot rolled, 2¼" rd. AISI A3140 for comparison. Microstructure to left: annealed to 197 Brinell, right: as rolled, 229 Brinell.

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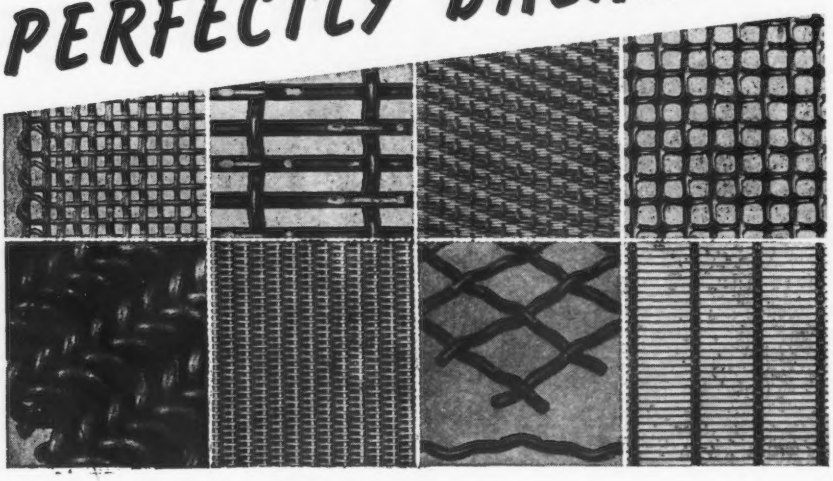

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Tells how "Buffalo" Stainless Steel Wire Cloth cuts costs and improves performance in thousands of installations. Valuable data on corrosion-resistance. Write for your copy.

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surface." Or, the paper noted: "Any kind of pavement which can support an 18,000-lb axle load (a standard now in use in many states) without undue stress can safely carry dual axles, each with an 18,000-lb load."

Asserting that "sound engineering calls for a structure with no weak part," Dr. Worley in his paper pointed at current plans for new bridges as being woefully behind the times with respect to carrying capacities.

Specifications for the 34,000 to 40,000-mile Interstate Highway System, to cost $12 to $15 billion, Dr. Worley explained, at no place suggest a heavier gross load than 72,000 lb for a tractor semi-trailer with a distance of 28 ft from leading axle of the trailer to the rear axle of the semi-trailer. But, he made clear:

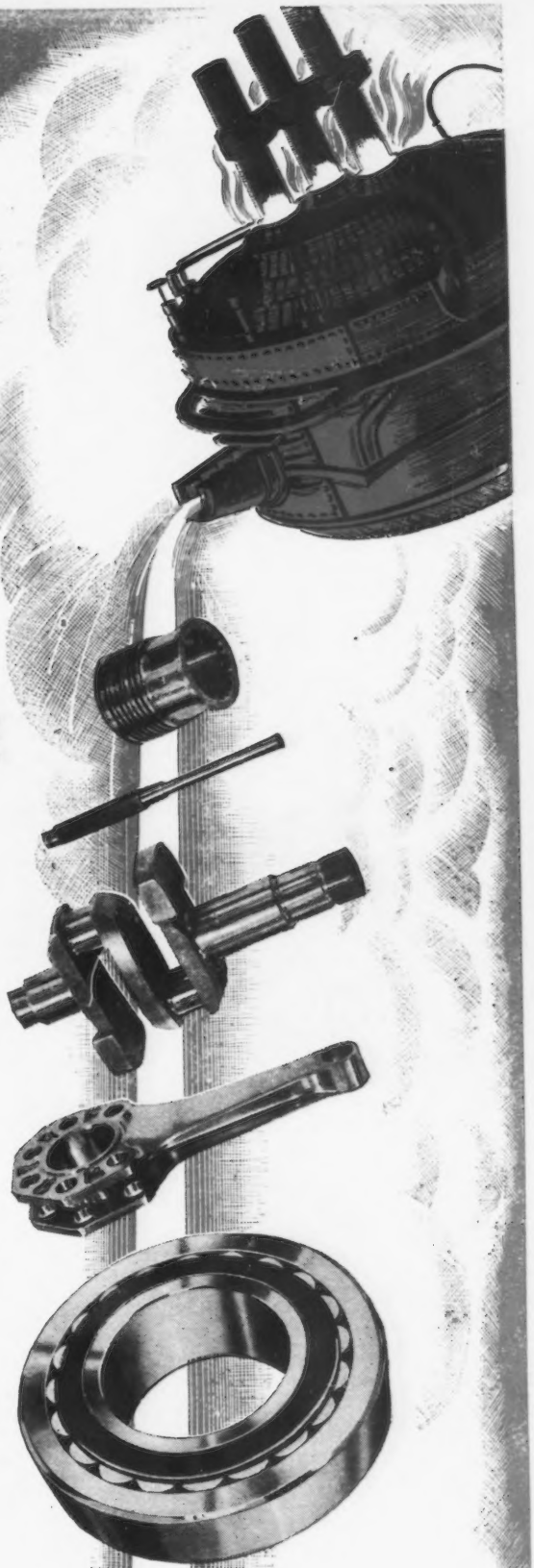
"As has already been shown, quite conclusively, the paving surface of the Interstate Highway System can support concentrated loads of 18,000 lb spaced 42 in. apart for an indefinite length, without overstresses, which for 60 ft is more than 300,000 lb, bridges of course excepted. A 9-axle vehicle with such an overall length is practical, the gross weight of which is 152,000 lb—8000 lb for the leading axle and 18,000 for each of the other axles. Eight-axle and 7-axle combinations with similar axle gross loads will have 134,000 and 116,000 lb, respectively."

Attendance at Western Metal Show Expected To Go Beyond 40,000

Cleveland

• • • **More than 40,000** manufacturers, metallurgists and members of the metals industries are expected to attend the fifth Western Metal Congress and Exposition, which will be held in the San Francisco-Golden Gate area for six days beginning March 22, 1947, according to W. H. Eisenman, managing director of the event and national secretary of the American Society for Metals.

Mr. Eisenman said his estimate of attendance was based upon attendance figures of the last previous Western Metals Congress and Exposition held in Los Angeles in 1941, and the fact that more manufacturers of metals in-



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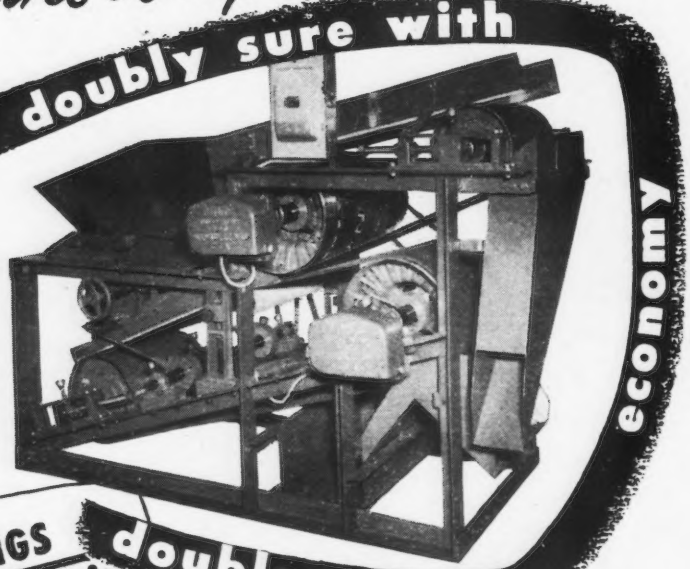
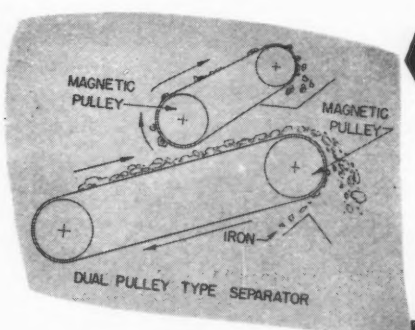
Make scrap separation doubly sure with economy



DINGS magnetic separators — double action

Separation of scrap in your shop is a money-saver! In separating ferrous and non-ferrous scrap, you need the "double action" you get with a Dings DA Magnetic Pulley Separator. Employing two magnetic pulleys in a self-contained unit—one above and one below the material conveyor—provides maximum, selective disentanglement of magnetic and non-magnetic particles. The first pulley lifts the bulk of the iron off the conveyor . . . any particles that are too small or too deeply buried are caught by the second pulley. Thus, between the two, you can be sure—"doubly sure"—of completely effective separation.

how it works:



Ferrous scrap is lifted off the main belt conveyor by the first magnetic pulley. It is carried up and around the pulley on the upper belt and discharged automatically into a chute. Any iron remaining on the conveyor is attracted to the main belt surface, carried to the underside of the second magnetic pulley, and discharged automatically after passing beyond the field of magnetic influence. A reciprocating feeder mechanism distributes the material evenly on the conveyor belt—a very important factor in successful separation—no manual attention except for loading of hopper.

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dustries products are showing in 1947 than ever before in a Western Metal show. Also, the technical programs already completed show more than 75 technical papers, lecture courses and round table discussion, also a new high for this event.

"Current interest in the progress made in metal alloys, metals manufacturing and fabricating equipment and other phases of the metals industries is at a high point," Mr. Eisenman said. "Never before have we seen such a manifestation of interest in the field. Attendance at the recently held National Metals Congress and Exposition at Atlantic City showed without question that general interest in achievements of the field is at an all-time high."

Sixteen western divisions of technical societies are actively cooperating in the program and other activities of the Western Metal Congress and Exposition. The list includes the American Society for Metals, sponsors of the event; the American Chemical Society; the American Foundrymen's Assn.; the American Institue of Mining & Metallurgical Engineers; the American Industrial Radium & X-Ray Society; the American Institute of Electrical Engineers; the American Society for Testing Materials; the American Society of Tool Engineers, Inc.; the American Welding Society; the Mining Assn. of California; the Northwest Electric Light & Power Assn.; the Pacific Coast Electric Assn.; the Purchasing Agents Assn. of California, Inc.; Society of Automotive Engineers; Western Oil & Gas Assn., and the American Petroleum Institute.

All technical sessions and other educational activities of the cooperating societies will be held in the Oakland Civic Auditorium, the Auditorium Arena and the Auditorium Exhibit Hall, same buildings where the Exposition will take place.

The technical program will open its activities on Monday, Mar. 24, and will continue through Thursday, Mar. 27. Members of the cooperating societies will attend sessions to be addressed by nationally renowned technical speakers. Daily meetings will begin at 9 a.m. and during the day until 5 p.m. and are

Our hands are TIED, too!

There's no secret about the fact that reconversion has hit serious snags. There's no one in industry that has escaped the chain of events which tied our hands.

Back in '41 and '42, and all during the war emergency, Levinson Steel Sales was able to maintain fairly comprehensive inventories. By anticipating requirements we were usually in position to adequately serve our customers in war industries.

But in the present situation we have had no such opportunity. As with others in our industry, our inventory is at its lowest ebb. Hence we cannot offer our customers the usual wide range of items which they have been accustomed to expect from us.

We ask only that you understand our position, and that you believe us when we say *we are striving to do our very best under unusual conditions.*

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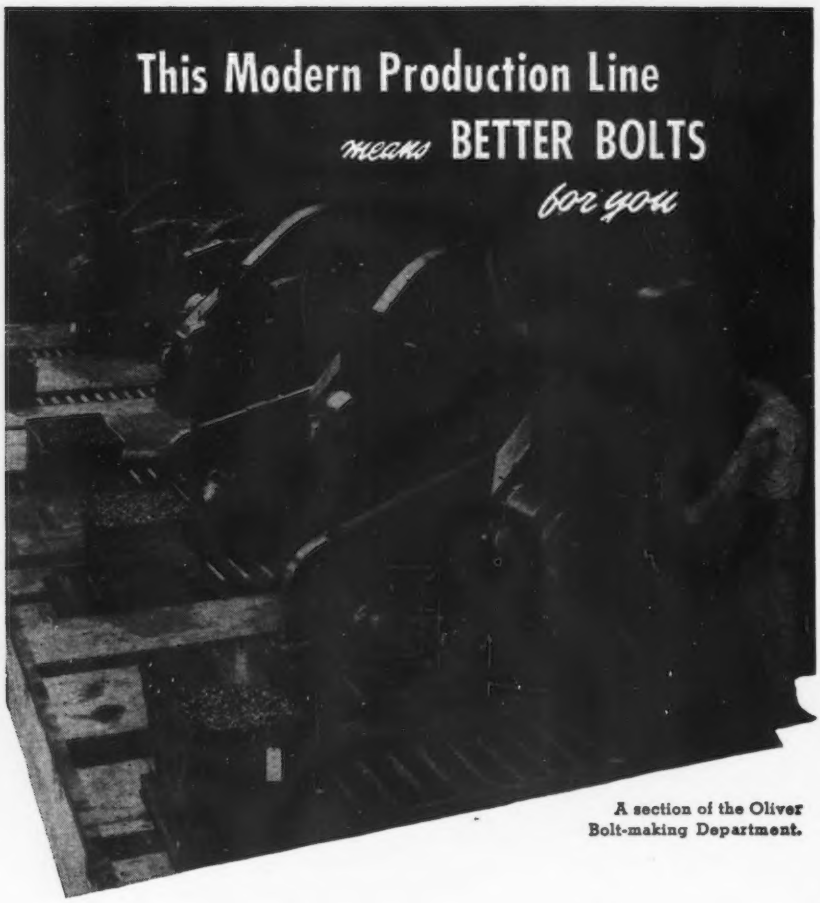

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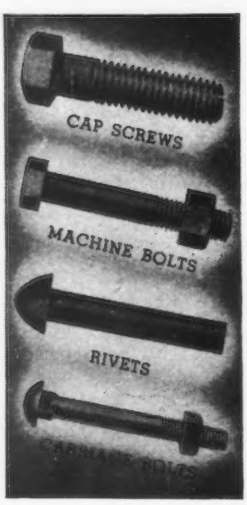

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expected to attract capacity audiences.

Among the speakers who will address the Congress are: A. L. Boegehold, president, A.S.M., and head of the metals department, General Motors Research Laboratory, Detroit; E. E. Thum, editor of *Metal Progress*, journal of the American Society for Metals, Cleveland; Walter Jominy, Chrysler Corp.; Dr. A. H. d'Arcambal, Pratt & Whitney Airplane Division, Hartford, Conn.; Dr. Francis B. Foley, the Midvale Co., Philadelphia; Dr. John Chipman, Professor of Metallurgy, M.I.T.; Dr. C. H. Herty, Jr., Bethlehem Steel Corp, Bethlehem, Pa.; Given Brewer, consulting metallurgist, Laguna Beach, Calif.; Dr. V. N. Krivobok, International Nickel Co., New York; Dr. E. H. Dix, Jr., Aluminum Co. of America, New Kensington, Pa.; Dr. J. C. MacDonald, Dow Chemical Co., Midland, Mich.; R. M. Burns, Bell Telephone Laboratories, Murray Hill, N. J.; F. T. Letchfield, vice-president, Wells Fargo Bank & Union Trust Co., San Francisco, Dr. Arthur E. Focke, Diamond Chain & Mfg. Co., Indianapolis; and Glen Riegel, Caterpillar Tractor Co., Peoria, Ill.

CPA Revokes Direction

Washington

• • • **To facilitate the sale** of steel from government-owned surplus, Direction 9 to PR-13 has been revoked by CPA. This direction imposed a ceiling of 45 days' requirements on inventories resulting from a user's acquisition at a special sale of the following forms of steel: Hot or cold-rolled carbon steel sheet, 14-gage and lighter; flat galvanized sheet and strip; electrical silicon sheet; tinplate; wire rope and cable. Hereafter, such users are governed by the general paragraph of PR-13, which provides that the quantity of a material or product which a user may buy from surplus shall not exceed that which will result in an inventory of 90 days' requirements. new production.

CPA emphasized, however, that this limited exception to the 45-day inventory limitation applies only to steel bought at a special sales under PR-13, including government surplus, and not to purchases from new production.

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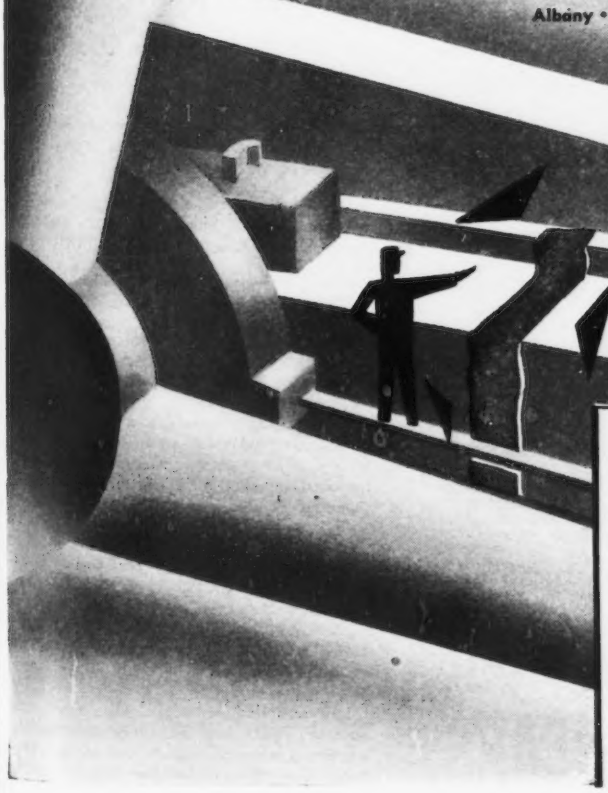

Send for FREE booklet which tells all about how to use these cast iron electrodes.

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Gentlemen:
Please send booklet telling how these electrodes can save time, money, and how I can get better welds on cast iron.

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Position_____
Company_____
Address_____
City_____ State_____
Your electrode supplier's name_____

FREE
-TO GEAR BUYERS

FREE THIS HANDY GEAR TOOTH CALCULATOR

The numbers on the outer edge of this device represent the diametral pitch of the gear. By turning the cut-out section to the desired number, the figures appearing in the space show circular pitch, circular thickness, addendum and the whole depth. • These calculators are available to gear buyers upon request—with our compliments.

YOU FURNISH THE SPECIFICATIONS • WE'LL PRODUCE THE GEARS

PERKINS Precision, Custom-Cut

PERKINS MACHINE & GEAR CO., Springfield 2, Mass. GEARS

10,000 Trade Names

(CONTINUED FROM PAGE 66)

Flualyzer: Instrument for measuring carbon dioxide content of generated gas in heat-treating furnaces. Charles Engelhard, Inc., 90 Chestnut St., Newark, N. J.

Fluoborate: Fluoborate electroplating solutions for depositing practically all metals. General Chemical Co., 40 Rector St., New York 6.

Fluoradex: X-ray apparatus. Westinghouse Electric Corp., East Pittsburgh, Pa.

Fluorospot: X-ray apparatus. Westinghouse Electric Corp., East Pittsburgh, Pa.

Flush-Kleen: Clog-proof sewage pump; solids do not reach impeller. Chicago Pump Co., 2300 Wolfram St., Chicago 18.

Flux-Injection: Method of flux addition to oxy-acetylene flame to permit cutting of stainless steel and nonferrous metals. Air Reduction, 60 E. 42nd St., New York 17.

Fluxrite: Pb-Sn alloy for solder. National Lead Co., 111 Broadway, New York.

Flying Fox: Electric and special alloy steels. Samuel Fox & Co., Ltd., Sheffield, England.

F Nickel Type B: Inoculant for cupola spout or ladle additions to cast iron. International Nickel Co., Inc., 67 Wall St., New York 5.

Foamaster: Chemical fire extinguisher. American-LaFrance-Foamite Corp., Elmira, N. Y.

Foamex: Chemical fire extinguisher. American-LaFrance-Foamite Corp., Elmira, N. Y.

Foamite: Chemical fire extinguisher. American-LaFrance-Foamite Corp., Elmira, N. Y.

Fogpruf: Goggle lens cleaner and anti-fogging compound. Mine Safety Appliances Co., Braddock, Thomas & Meade Sts., Pittsburgh.

Foille: Ointment for treatment of all types of burns. Mine Safe Appliances Co., Braddock, Thomas & Meade Sts., Pittsburgh.

Follansbee Special Power Transformer: Steel for transformers. Follansbee Bros. Co., Follansbee, W. Va.

Fonda Gage Blocks: Series of gage blocks and precision gages. Fonda Gage Co., 59 Daly St., Stamford, Conn.

Form-Set: Preformed wire rope and strand. Bethlehem Steel Co., Bethlehem.

Formweld: Method of hard facing steel products with Colmonoy metal. Colmonoy Corp., Fisher Bldg., Detroit 2.

Forticel: Cellulose acetate and ethyl cellulose plastic materials used in molded form with metals as cores or decorations and as lumination over metal foil, electrical insulation. Celanese Plastics Corp., 180 Madison Ave., New York 16.

Fortisan: Synthetic yarns for tinsel cords. Celanese Plastics Corp., 180 Madison Ave., New York 16.

Fort Pitt: Malleable iron castings. Fort Pitt Malleable Iron Co., Pittsburgh 30.

46: Low-chromium structural alloy steel with corrosion and heat resistance intermediate between plain carbon steels and higher chromium and chromium-nickel steels; readily

The CONE AUTOMATIC MACHINE COMPANY

sees many

GOOD THINGS AHEAD

It is reported that . . . . . .

Westinghouse calls its new steel encased motor the most revolutionary change in construction in 58 years and states that it delivers up to 134% more power per pound than previous motors.

get ready with CONE for tomorrow

Federal Telephone and Radio Corporation will conduct experiments with television, FM and radar in a building at Nutley, N.J., which will be completely shielded from atmospheric electricity.

be ready with CONE for today

Called the world's largest, a spot welder that can make 48 welds at a single stroke is in use at Pullman-Standard Car Manufacturing Co.

get ready with CONE for tomorrow

A division of Reynolds Metals Company has a new line of all-aluminum bicycles and scooters.

be ready with CONE for today

Raytheon Mfg. Co. has an electronic kitchen range. The food is put in a disposable dish and quickly cooked by the energy from a magnetron tube.

get ready with CONE for tomorrow

Bell Telephone Laboratories report that they have developed a tube that will send a hundred million words per minute by telegraph.

be ready with CONE for today

The Army Air Force has contracted with Fairchild Engine and Airplane Co. for fundamental research in the use of atomic energy in aircraft.

get ready with CONE for tomorrow

Aluminum Co. of America has recently supplied a 100-foot all-aluminum span for a railroad bridge at Massena, New York.

The Souhegan Mills of Wilton, N. H., believes that its molded board, made of shavings, can compete in price and utility with plywood or lumber.

be ready with CONE for today

The U. S. Bureau of Mines finds that Freon II is more effective in fighting gasoline fires than any of the other gases tested.

get ready with CONE for tomorrow

Patent 2,404,206 has been granted for a method of mining practically pure copper by dissolving it chemically and accumulating it electrolytically.

be ready with CONE for today

Nylon drive ropes are said by Plymouth Cordage Company to reduce machine shut-downs.

The behavior of piston rings and oil films has been studied by the National Advisory Committee for Aeronautics by using a glass engine cylinder.

get ready with CONE for tomorrow

When their new 2-million volt machine is installed, Babcock and Wilcox Co. will have 12 X-ray machines in use for checking steam generating equipment.

be ready with CONE for today

Blaw-Knox has built two 23-cubic yard clamshell buckets for unloading coal on Lake Superior. They weigh nearly 14 tons apiece and are believed to be the largest of their kind.

get ready with CONE for tomorrow

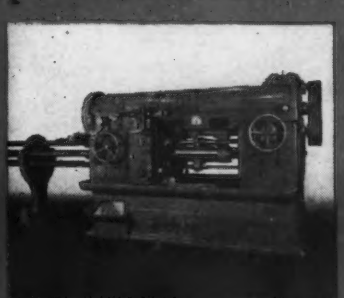
Scientific American prophesies that the use of silicones will bring about a revolution in surface finishes comparable to that resulting from the development of nitrocellulose lacquers.

FOLLOW THESE PAGES FOR NEWS OF PROGRESSIVE PRODUCTION

Give soft jobs to *any* Automatic

put the *tough* ones on a CONE

From 65 mm 3312 stock, a 2⅝" Six Spindle Conomatic, with 13 HSS tools, produces the part shown here in 71 seconds.



Ask your CONE representative to show you our new color motion picture

CONE

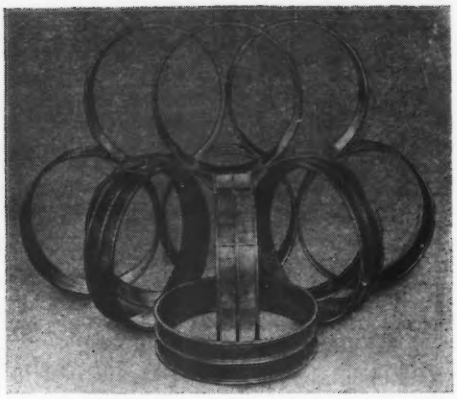
AUTOMATIC MACHINE CO., INC. ★ WINDSOR, VERMONT, U.S.A.

36

Typical

of

HENDRICK WORKMANSHIP



These milled-slot screens, for centrifugal drying of various materials, are made of 1/8" stainless steel, and in their fabrication tolerances as close as plus or minus .0001" were maintained; an illustration of Hendrick's expert workmanship.

Hendrick offers unusual facilities for the manufacturing of many specialized products, of which these screens are a typical example. Write for detailed information.

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Perforated Metals
Perforated Metal Screens
Architectural Grilles
Mitco Open Steel Flooring,
"Shur-Site" Treads and
Armorgrids

ANY METAL • ANY PERFORATION

Industrial—Well balanced screens of excellent material and workmanship to assure maximum screen production combined with durability.

Ornamental—Approved patterns and finishes including many exclusive and characteristic designs for grilles and furniture. We invite your inquiries.

The Harrington & King PERFORATING Co.

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Eastern Office, 114 Liberty Street, New York 6, N. Y.

fabricated; air hardening. Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh.

Foseco Albral: Fluxing agent for improving the casting and physical properties of aluminum bronzes, nickel-base alloys containing aluminum, etc. Foundry Services, Inc., 277 Madison Ave., New York.

Fosterite: Insulating compounds. Westinghouse Electric Corp., East Pittsburgh, Pa.

4A: Cutting down, buffing and mirror-finishing compounds. Harrison & Co., Inc., Haverhill, Mass.

Fox Nitralloy: Alloy steels with Cr, Al, Mo for nitrided parts. Samuel Fox & Co., Ltd., Sheffield, England.

Fracto-Crete: Dry refractory mix (castable refractory); when mixed with water it is poured or tamped into place like ordinary concrete to form a monolithic refractory lining. Ramtite Co., 2563 W. 18th St., Chicago 8.

Frankite: Series of plain-carbon steels for hydraulic bodies and compressor cylinders; and abrasion, corrosion and heat-resistant Ni-Cr steels for mixer blades, ash chutes and furnace supports. Frank Foundries Corp., Moline, Ill.

Frankite: Series of heat and corrosion-resisting Ni-Cr-Cu-iron alloys and straight-chrome cast irons. Kay-Brunner Steel Products, Inc., 2723 Elm St., Los Angeles.

Freemachineweld: Machinable welding electrode. Westinghouse Electric Corp., East Pittsburgh.

Friction Fighter: Ball and roller bearings. Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6.

Frictionless: Standard babbitt metal. Frictionless Metal Co., 1458 Collins St., St. Louis 6.

Frigidal: Iron alloy with 35 Ni, low Cr for electric resistances. Vereinigte Deutsche Nickelwerke A.G., Schwerte, Germany.

Frogalloy Electrodes: Arc-welding electrodes for building up railroad frogs, crossings etc., and any other application requiring resistance to impact. McKay Co., York, Pa.

Frontier Alloy: Series of copper and aluminum alloys with also Sn, Pb, Mn, Fe, Ni, Zn; for bearings, castings, worm gears, anticorrosion service in paper mills and mines. Frontier Bronze Co., Elmwood Ave. & Erie R.R., Niagara Falls, N. Y.

Frontier Alloy: 10 Al, 89 Cu and 1 Fe alloy for housing nuts, worm gears, bearings, spacer boxes. Frontier Bronze Co., Niagara Falls, N. Y.

Full Back: Face milling cutters. Kearney & Trecker Corp., Milwaukee 14.

Fuller: Pulverized coal-feeders. Babcock & Wilcox Co., 87 Liberty St., New York 6.

Fulmer: Honing machines for all types of cylinders; piston ring lapping machines; connecting rod borers. C. Allen Fulmer Co., 1211 First National Bank Bldg., Cincinnati 2.

Furnas Crete: Firebrick. Mexico Refractories Co., Mexico, Mo.

Furnascote: Refractory mortar. Laclede-Christy Clay Products Co., Ambassador Bldg., St. Louis 1.

10,000 TRADE NAMES

Furnaseal: Plastic refractories. Laclede-Christy Clay Products Co., Ambassador Bldg., St. Louis 1.

Furnatron: Electronic control system for electric resistance heated furnaces. Westinghouse Electric Corp., East Pittsburgh.

Furodit: Series of chrome stainless irons with Al or Mo or Ta, for heat and corrosion resistant parts. Rochling-Buderus A.G., Wetzlar, Germany.

Fusebond: Process and equipment for preparing surfaces electrically instead of mechanically, prior to metal spraying. Metallizing Engineering Co., Inc., 38 30th St., Long Island City 1, N. Y.

Fusetrons: Electrical fuse with thermal cutout. Bussmann Mfg. Co., St. Louis 7, Mo.

Fuse-Well: Flux-coated welding rod for cast iron. Chicago Hardware Foundry Co., North Chicago, Ill.

Fuze-Bond: Mechanical preparation of machine parts preparatory to metal-spray build-up. Metallizing Engineering Co., Inc., 33-16 30th St., Long Island City, N. Y.

Fuzee: Engine overhaul cleaner. Turco Products, Inc., Los Angeles 54.

Fyberoid: Fish paper in sheets and rolls. Wilmington Fibre Specialty Co., Wilmington, Del.

Fyer-Wall: Corrugated and tin-clad doors. Richards-Wilcox Mfg. Co., Aurora, Ill.

Fyre-Mortar: High-temperature dry refractory cement for bonding fire brick. Quigley Co., Inc., 527 Fifth Ave., New York 17.

G

"G" 12: Non-welding electrical-contact alloy with low contact resistance; for circuit-breaker contacts. P. R. Mallory & Co., Ray F. Storrow Bldg., Indianapolis.

Garalun: Aluminum-oxide abrasive. Clover Mfg. Co., Norwalk, Conn.

G-A-W Carbonyl Iron Powder: High-purity iron powder for electrical applications, radio magnetic cores (and shield) for permeability tuning, etc. Advance Solvents & Chemical Corp., S. E. Corner 28th & 5th Ave., New York.

G.E.C. Heavy Alloy: 90 W, 7.5 Ni, 2.5 Cu; tensile strength and yield point comparable to high-grade steel; used as screen to absorb harmful radium radiations, also contacts of electrical circuit breakers. General Electrical Co., Ltd., Magnet House, Kingsway, London W.C. 2.

G-Iron: Graphitized pig iron. Tonawanda Iron Corp., North Tonawanda, N. Y.

GAlloy: Pb alloy for bearings. American Smelting & Refining Co., Perth Amboy, N. J.

G-Alloy: Zinc-bearing aluminum alloy for cast parts for trucks, airplane and boats. National Physical Laboratory, Teddington, England.

Gairing Tools: Standard and special tools for machining. Gairing Tool Co., 21221 Hoover Rd., Detroit.

Gair-Lock: Cutter heads accommodating a maximum number of blades with a rigidity that produces solid-tooth cutting action. Gairing Tool Co., 21221 Hoover Rd., Detroit.

(To Be Continued in Next Issue)

OUT OUR WAY

THAT'S TH' BIGGEST STRAIN OF BEIN' TH' HEAD OF ANYTHING! TH' ONES WHO CAN'T GET ALONG WITHOUT YOU ARE TOO QUICK WITH TH' PULMOTOR, AN' TH' ONES THAT CAN'T GET ALONG WITH YOU ARE TOO QUICK WITH TH' STRETCHER!
YEH--BUT IT WAS A TERRIBLE SHOCK! THEY JUST TOLD HIM THAT WE'RE OUTA SOL-SPEEDI-DRI AND THEY FERGOT TO ORDER SOME!
T. M. REG. U. S. PAT. OFF. COPR. 1946 BY NEA SERVICE, INC.
A CRYING SHAME
J.R.WILLIAMS

A crying matter? Sure . . . for when floors become oil- and grease-soaked . . . when their surfaces become ice-slick and dangerous . . . it's *time* to cry for SOL-SPEEDI-DRI, the oil-thirsty absorbent!

SOL-SPEEDI-DRI is a white, granular substance that soaks-up oil- and grease-deposits as a sponge soaks-up water. Just spread it around . . . and immediately, you've got a magic carpet of safety underfoot . . . no slipping or falling with SOL-SPEEDI-DRI on the job. Sweep it up with an ordinary, stiff broom . . . and your floors are bright and safe.

SOL-SPEEDI-DRI puts economy in any industrial plant on a firm foundation. Accident rates go down . . . productive time goes up . . . manpower is saved for other jobs. It works while you work . . . in safety!

SUPPLIERS: *East*—Safety & Maintenance Co., Inc., No. 1 Wall St., New York 5, N. Y.
South, Midwest & West Coast—Waverly Petroleum Products Co., Drexel Bldg., Philadelphia 6, Pa.

SOL·SPEEDI·DRI
OIL AND GREASE ABSORBENT
UL
Get the full story of SOL-SPEEDI-DRI today. Just write "SOL-SPEEDI-DRI" on your letterhead or business card for complete details and a free, generous sample.

Gallup Polls

(CONTINUED FROM PAGE 107)

the United States for more than two terms of 4 years each."

Presumably this means two consecutive terms, although the language is not clear on that point. It could also mean that no man would serve more than two terms, even though those terms might be separate in point of time and not consecutive.

The general idea that no man should serve for a third term has been the subject of several polls in the past. All have found majority sentiment favoring the limitation.

The trend:

"Would you favor or oppose a law which would keep all presidents of the United States from being elected for a third term?"

	July 1944 Pct	July 1945 Pct
Favor limitation	63	55
Opposed	32	40
No opinion	5	5

In today's survey a sharp difference of attitude by parties was noted. Among Republican voters polled, 69 pct indicated approval of prohibiting more than two terms in a row.

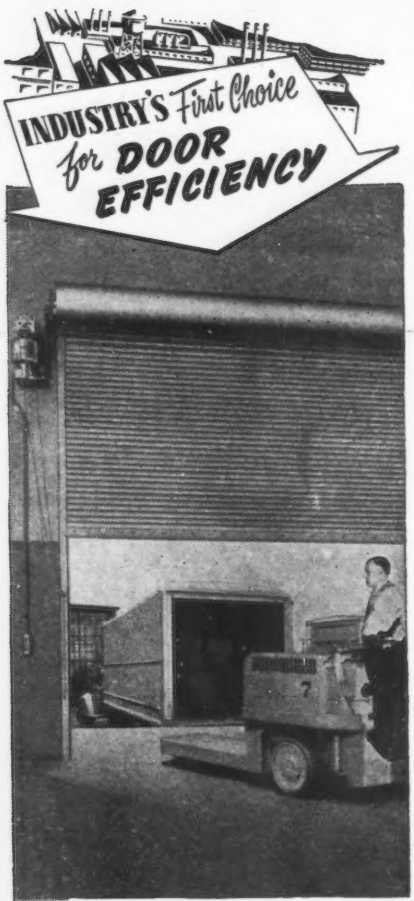
Among Democrats, the vote of approval is only 35 pct.

The Republican House steering committee is reported to have agreed to introduce legislation to limit presidential tenure to two terms.

Luria Bros. in Buffalo

Philadelphia

• • • **The opening of** a new branch office in Buffalo, with the appointment of Mr. Terry Hanlon as district manager, has been announced by Luria Bros. & Co., Inc., brokers and dealers in scrap iron and steel since 1889. Mr. Hanlon, who recently joined this organization, has been associated with the iron and steel scrap business in the Buffalo area for more than 30 years.



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ROLLING DOORS

Through the years, the multiple advantages of *coiling upward action* have won increasing, industry-wide preference for KINNEAR Rolling Doors — in plants of all sizes and types old and new.

KINNEAR advantages are quickly apparent: by rising vertically into a compact coil above the lintel, KINNEAR Rolling Doors save floor, wall, and ceiling space . . . open out of reach of damage by wind or vehicles . . . require no "clearance area" for operation . . . and clear *the entire doorway* when opened.

KINNEAR'S famous interlocking-steel-slat construction assures *extra* protection against fire, intrusion, accidental damage, and the elements.

For the *ultimate* in time-and-labor-saving efficiency, KINNEAR Motor Operators add push-button control, plus any number of remote control stations if desired. KINNEAR Rolling Doors are built in any size, for old or new construction. Write.

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KINNEAR ROLLING DOORS

a Combination hard to beat!
Two completely equipped spring plants, with engineering, production, heat-treating and testing facilities for any size of order —large or small. It's the kind of spring service you'll like.
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SPRINGS
Wire Forms
Small Stampings
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DIVISION OF
ASSOCIATED SPRING CORPORATION
TWO PLANTS FOR SPRING SERVICE
DETROIT 11, MICHIGAN
ANN ARBOR, MICHIGAN

The London Economist

(CONTINUED FROM PAGE 113)

bers or nominees of the ruling party. The power of the people must be in no way curtailed, nor should it be suffered to avoid using its power, for to be nonpolitical is almost as bad as voting for the opposition.

In these days it is not enough that subjects should obey their rulers; they must continually manifest their enthusiasm for them. It is not sufficient that they should suffer in silence; they must proclaim their joy. To stay at home on polling day would be treason; the citizen must vote and he must also vote rightly.

In the new democracy, the government submits itself unreservedly to the judgment of the electorate and a high degree of organization and skill is required to make certain that it cannot be defeated.

The simplest technique is that of prohibiting opposition parties altogether. In this system the electorate is presented with a single list of members of the ruling party and some nonmembers nominated by it; there is no alternative list. In the election campaign, of course, there is no criticism or contradiction of the ruling party's propaganda.

The voter can be induced to turn up at the polls by registering the fact that he has voted—with awkward consequences for those absent without good excuse; he can, if he likes, vote against the official list by striking it out in the secret ballot, but this is in any case a purely negative gesture.

Within these limits, however, the experienced election cook can work with decisive effect. His greatest asset is the police force, which is directly controlled by the ruling party, and especially that branch of it called the Security Police because its task is to produce security for the government and insecurity for everyone else. As election time draws near, the party expects that every policeman will do his duty, that he will zealously protect the government's supporters and be absent when the campaigners of the opposition are getting what they deserve.

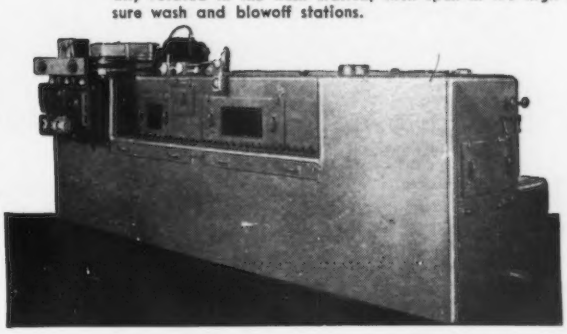
The citizen who is accustomed to the idea that any incautious

Ransohoff EQUIPMENT for the surface treatment of metals

What is YOUR Cleaning Problem?
RANSOHOFF can solve it!

THE RANSOHOFF bearing washer illustrated . . . istalled in a large Eastern plant . . . provides flush, solvent wash, and compressed air blowoff.

To insure thorough, careful cleaning, bearings are automatically rotated in the flush station, then spun in the high pressure wash and blowoff stations.



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1315 TOWNSHIP AVE. CINCINNATI 16, OHIO

Weldit Automatics

WELDING TORCH W-45. Strong and sturdy, 14 inches long, yet light in weight—only 17 ounces. Has lock control for continuous welding. Cuts oxygen and acetylene cost 1/3.

BLOWPIPE C-46. Has good balance . . . Comfortable grip . . . Closed hand releases gas . . . Open hand cuts it off . . . Reduces idle flame fire hazard . . . Works perfectly with natural gas, manufactured gas, butane and compressed air.

WELDING TORCH W-46. Has long lever for closed hand or finger-tip gas release or cut off. Allows wider operation range. Weight 14 ounces, length 13 inches.

Meet all Underwriters Requirements

WELDIT automatics are daily cutting costs, reducing fire hazards in many of the world's largest industrial plants. Some distributor territory still available. Write today for free descriptive bulletin.

Weldit INC. SINCE 1918

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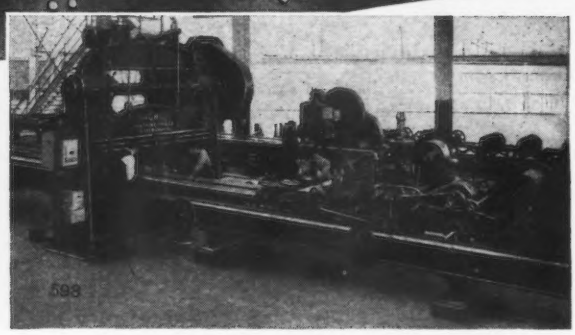
The No. 1 Production Tool!



Available in a wide range of models from completely automatic to hand-operated indicator types.

FOR accurate, economical production of rivet holes in plates or shapes, where quantity output is required, this famous Thomas Spacing Machine is the No. 1 choice of car builders and fabricators.

Write for Bulletin 306 or 306-A

THOMAS
MACHINE MANUFACTURING COMPANY
PITTSBURGH, 23, PA.

A FORTUNE IN PATTERNS

This is one of our storage sections. ***Strenes Metal*** castings have been made from these patterns.

Here are patterns for forming and drawing dies used by many of the largest sheet metal fabricators . . . manufacturers of appliances, automobiles, bicycles, blowers, caskets, implements, tractors, trucks, vaults, etc.

Here are also patterns for ***Strenes Metal*** castings employed as parts of equipment . . . bushings, melting pots, pump housings and impellers, lathe beds, machine bases and the like.

When you visit our plant, you'll probably be surprised at the volume of ***Strenes Metal*** castings we pour from day to day.

Strenes Metal
DRAWING AND FORMING DIES

THE ADVANCE FOUNDRY COMPANY
100 SEMINARY AVENUE — DAYTON 3, OHIO

word, even in private conversation, may be denounced to the authorities, who knows that spies are everywhere and that walls have ears, who has heard in hushed whispers what is the fate of those who are taken away in the night to the cells of the political police, can never feel safe in any act or word hostile to the government—not even in a secret ballot. He cannot be sure that there really is such a thing as a secret ballot. Nor is there. Nobody has yet devised a ballot system the secrecy of which cannot be violated with the collusion of the polling station officials.

The good cook does not, of course, neglect the electoral registers. The more dead men are included in them the better, for their votes can be cast by good patriots on the day of the poll. On the other hand, voters definitely known to be undesirable will find it quite difficult to get themselves inscribed, even though they are legally qualified.

If, nevertheless, all else fails and electoral defeat impends, there is always the last reserve —the art of counting. It is, after all, the function of officials to announce the results, and the ruling party should have seen to it that the right men are in the right places. The results must be announced boldly and with exact figures—no round numbers.

The opposition may make protests and objections; there may be appeals to the courts—though, if the judiciary has been properly purged, that will not do any harm either—and long before there can be any rulings on hundreds of disputed cases the world will have forgotten all about the elections. The important thing is to get the total figures out at once, so that the electorate can be told what it has done, and foreign correspondents can cable the news the same day.

But it is better, if possible, not to win an election by counting; it is far better to win it honestly, by convincing electors of the criminality of voting the wrong way. The secret lies in concentration on the prudent man and his desire to keep out of trouble. His prayer must always be *mutatis mutandis*, the prayer of the prudent German under Hitler: "O God, make me dumb and keep me out of Dachau!"